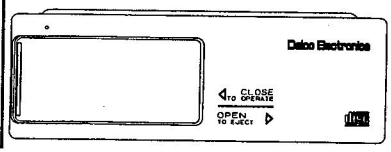
PIONEER®
The Art of Entertainment

Service Manual



ORDER NO.
CRT1853

MULTI-COMPACT DISC PLAYER

CDX-M2016ZG US

COMPACT disc DIGITAL AUDIO

- **This model has been installed in Delco .**
  Delco No. : 16220776
- **See the separate manual CX-633(CRT1658) for the CD mechanism description and disassembly.**
- **The CD mechanism employed in this model is one of CX-633 series.**

CONTENTS

1. SPECIFICATIONS....2
2. OPERATION....2
3. CONNECTOR FUNCTION DESCRIPTION....2
4. DISASSEMBLY....3
5. ADJUSTMENT....4
6. IC INFORMATION....14
7. ELECTRICAL PARTS LIST....16
8. BLOCK DIAGRAM....18
9. CONNECTION DIAGRAM....20
10. SCHEMATIC CIRCUIT DIAGRAM....23
11. CIRCUIT DIAGRAM AND PATTERN....26
12. EXPLODED VIEW AND PARTS LIST....31
13. PACKING METHOD....39
14. USING THE CEN-822 CD CONTROLLER TOOL....40

PIONEER ELECTRONIC CORPORATION 4-1, Meguro 1-Chome, Meguro-ku, Tokyo 153, Japan
PIONEER ELECTRONICS SERVICE INC. P.O.Box 1760, Long Beach, CA 90801-1760 U.S.A.
PIONEER ELECTRONIC [EUROPE] N.V. Haven 1087 Keetberglaan 1, 9120 Melsele, Belgium
PIONEER ELECTRONICS ASIACENTRE PTE.LTD. 501 Orchard Road, #10-00, Lane Crawford Place, Singapore 0923

© PIONEER ELECTRONIC CORPORATION 1996

K-FFM. MAY. 1996 Printed in Japan

1. SPECIFICATIONS

General
System ..... Compact disc audio system
Usable discs ..... Compact Disc
Signal format ..... Sampling frequency: 44.1 kHz
Number of quantization bits: 16; linear
Power source ..... 14.0 V DC
(10.5 - 16.0 V allowable)
Dimensions ..... 275 (W) × 93 (H) × 172.2 (D) mm
Weight 2.9kg

Audio
Distortion ..... 0.1 % or less(20 kHz)
Signal-to-noise ratio ..... 80 dB or more(20 Hz-20 kHz)
Separation ..... 70 dB or more(20 Hz-20 kHz)
Muted audio level ..... 80 dB or more
Dynamic range ..... 80 dB or more(20 kHz)

2. OPERATION

Pressing the clear button

If the power does not switch on or if the compact disc player does not operate when the button on the multi-CD controller is pressed, or if the multi-CD controller display is incorrect, press this button on the player with the tip of a pencil to restore normal operation. (This button is located inside the door.) Always press the clear button on the multi-CD controller, too, after pressing this button(Fig. 1).

- If the clear button is pressed when the player contains a magazine or the ignition switch is set to the ON or ACC position, the CD title display and ITS memory are cleared.

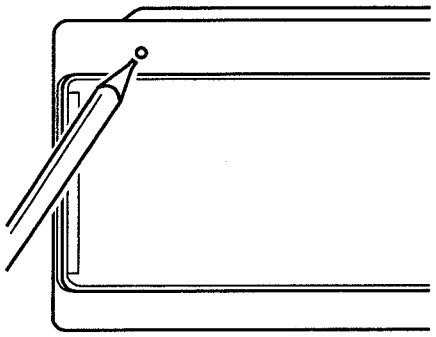
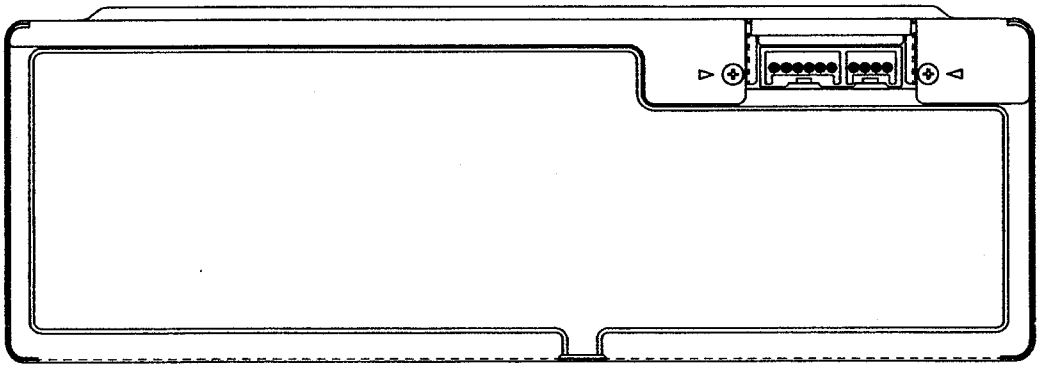


Fig. 1

3. CONNECTOR FUNCTION DESCRIPTION



1	L	6	NC
2	R	7	GND
3	COMMON	8	NC
4	SGND(DRAIN)	9	NC
5	BATT	10	BUS(E&C DATA)

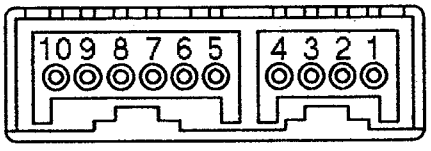


Fig. 2

4. DISASSEMBLY

● Removing the Two Cases

1. Remove the six screws.
2. Remove the upper case and lower case.

● Removing the Grille Assy

1. Press the four tabs indicated by arrows and then pull out the grille assy.

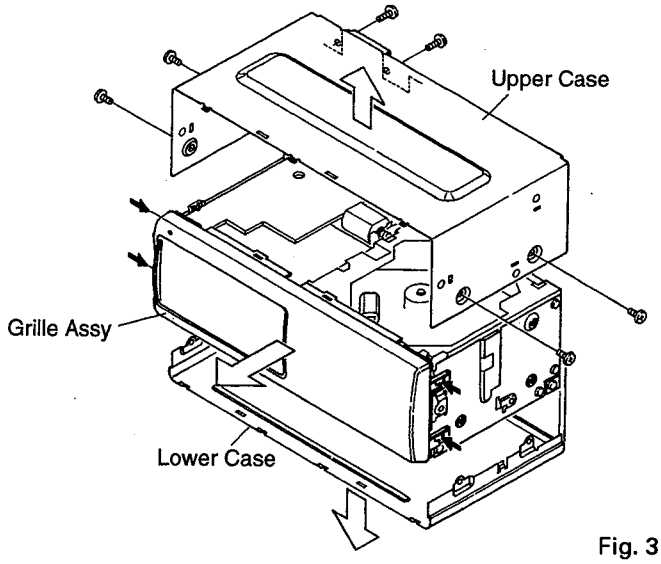


Fig. 3

● Removing the Extension P.C.Board

1. Remove the one screw.
2. Unbend the tabs at three locations indicated by arrows until straight.
3. Remove the extension P.C.Board.

● Removing the Main Unit

1. Remove the one screw.
2. Unbend the tab at one location indicated by arrow until straight.
3. Remove the main unit.

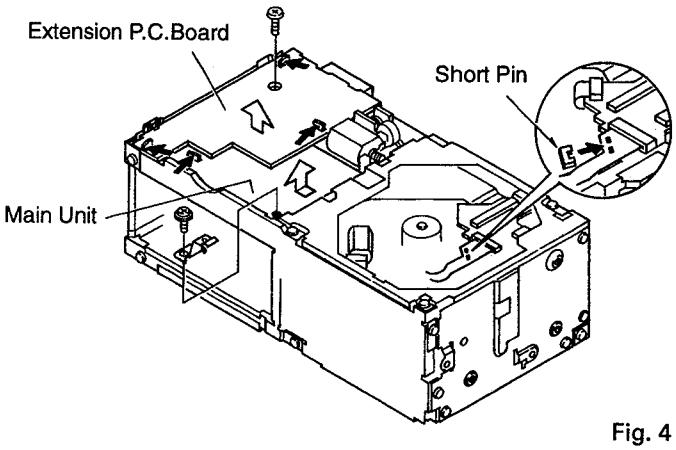


Fig. 4

Before disconnecting the connector(PU unit connector), attach a short pin as illustrated.

5. ADJUSTMENT

1)Precautions

· This unit uses a single power supply (+5V) for the regulator. The signal reference potential, therefore, is connected to REFO(approx. 2.5V) instead of GND.
If REFO and GND are connected to each other by mistake during adjustments, not only will it be impossible to measure the potential correctly, but the servo will malfunction and a severe shock will be applied to the pick-up. To avoid this, take special note of the following.
Do not connect the negative probe of the measuring equipment to REFO and GND together. It is especially important not to connect the channel 1 negative probe of the oscilloscope to REFO with the channel 2 negative probe connected to GND.
Since the frame of the measuring instrument is usually at the same potential as the negative probe, change the frame of the measuring instrument to floating status.
If by accident REFO comes in contact with GND, immediately switch the regulator or power OFF.

· Always make sure the regulator is OFF when connecting and disconnecting the various filters and wiring required for measurements.

· Before proceeding to further adjustments and measurements after switching regulator ON, let the player run for about one minute to allow the circuits to stabilize.

· Since the protective systems in the unit's software are rendered inoperative in test mode, be very careful to avoid mechanical and / or electrical shocks to the system when making adjustment.

· Disc detection during loading and eject operations is performed by means of a photo transistor in this unit.Consequently, if the inside of the unit is exposed to a strong light source when the outer casing is removed for repairs or adjustment, the following malfunctions may occur.
*During PLAY, even if the eject button is pressed, the disc will not be ejected and the unit will remain in the PLAY mode.
*The unit will not load a disc.
When the unit malfunctions this way, either re-position the light source, move the unit or cover the photo transistor.

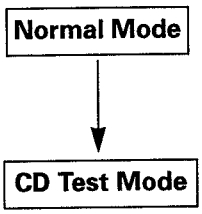
· When loading and unloading discs during adjustment procedures, always wait for the disc to be properly clamped or ejected before pressing another key. Otherwise, there is a risk of the actuator being destroyed.

· Turn power off when pressing the button **FF** or the button **REV** key for focus search in the test mode. (Or else lens may stick and the actuator may be damaged.)

2)Test mode

· This unit is adjusted in a combination with the CD controller tool(CEN-822). Each regulator key should be operated at the tool.
With the CEN-822 taken up for reference, a description will be given below concerning how to enter into the test mode, including key operations. The key in the adjustment text is also one of the CEN-822 keys.

· How to enter into the test mode

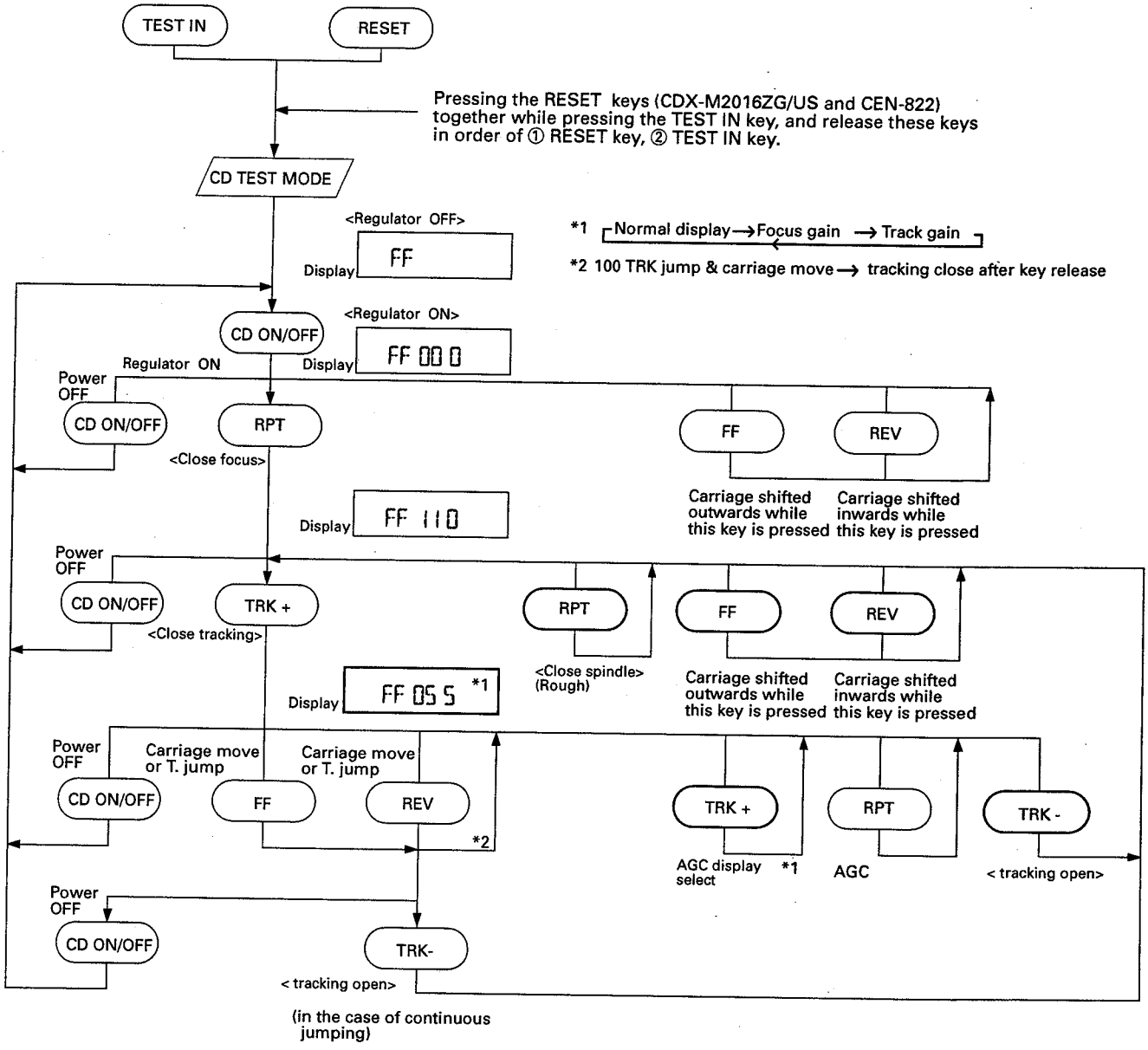


Pressing the RESET keys (CDX-M2016ZG/US and CEN-822) together while pressing the TEST IN key, and release these keys in order of ① RESET key, ② TEST IN key.

· Resetting the test mode
Pressing the RESET keys (CDX-M2016ZG/US and CEN-822) together.

· SINGLE TRK will continue to operate even after the key is released.Tracking is closed the moment C-MOVE is released.

● Flow Chart



·DISC change : 1-12 key

● Measuring Equipment and Jigs

Adjustment	Measuring equipment & jigs
1 Tracking Error Offset Adjustment 1	DC V Meter
2 Grating Check / Adjustment 1	Oscilloscope, ABEX TCD-784 (or SONY TYPE 4), Two L.P.F., Clock Driver
3 Grating Adjustment 2	Oscilloscope, Grating Adjustment Filter (B.P.F.), mV Meter, ABEX TCD-784 (or SONY TYPE 4), Two L.P.F., Clock Driver
4 Tracking Balance Adjustment 1	Oscilloscope, L.P.F., ABEX TCD-784 (or SONY TYPE 4)
5 Focus Bias Adjustment	Oscilloscope, ABEX TCD-784 (or SONY TYPE 4)
6 RFO Offset Adjustment	Oscilloscope, ABEX TCD-784 (or SONY TYPE 4)
7 Tracking Error Offset Adjustment 2	DC V Meter
8 Tracking Balance Adjustment 2	Oscilloscope, L.P.F., ABEX TCD-784 (or SONY TYPE 4)

● Adjustment Point and Test Point

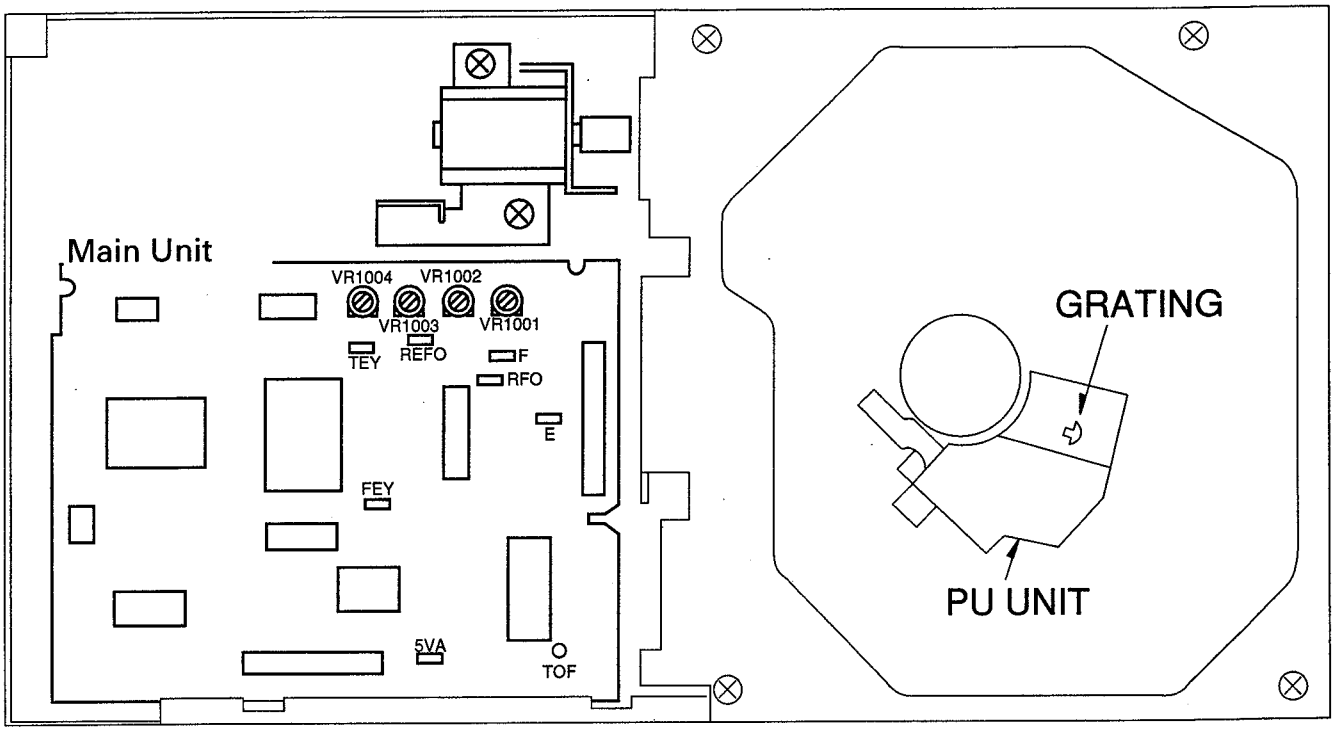


Fig. 5

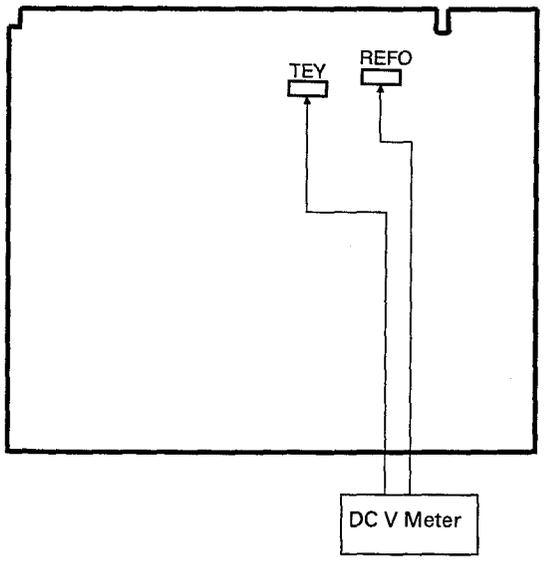
VR1001	TRACKING ERROR OFFSET
VR1002	TRACKING BALANCE
VR1003	FOCUS ERROR BIAS
VR1004	RFO OFFSET

1 Tracking Error Offset Adjustment 1

·**Purpose :**
To adjust the offset of the tracking pre-amp to zero.
·**Symptoms of Mal-adjustment :**
Track search NG, carriage runaway, poor playability.

·**Measuring Equipment / Jig**	·DC V Meter
·**Measuring Point**	·TEY
·**Test Disc , Mode**	·No disc, TEST MODE
·**Adjustment Point**	·VR1001(TE OFFSET VR)

Main Unit



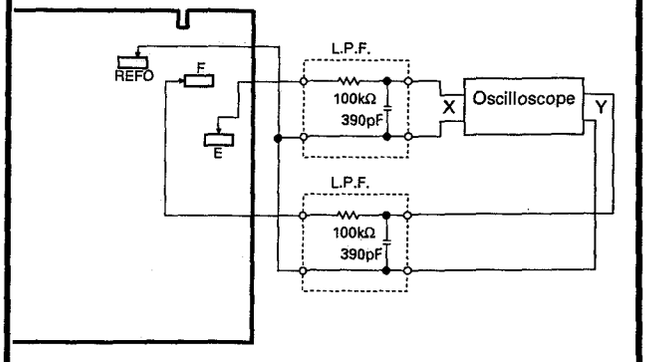
Adjustment Procedure
1.Switch the regulator on.
2.Using VR1001 (TE OFFSET) adjust DC voltage of TEY from REFO to 0±25mV.

2 Grating Check / Adjustment 1

·**Purpose :**
To check that the PU grating is correctly aligned after the PU unit has been replaced.
·**Symptoms of Mal-adjustment :**
Unable to play disc, track skip during search, search NG.

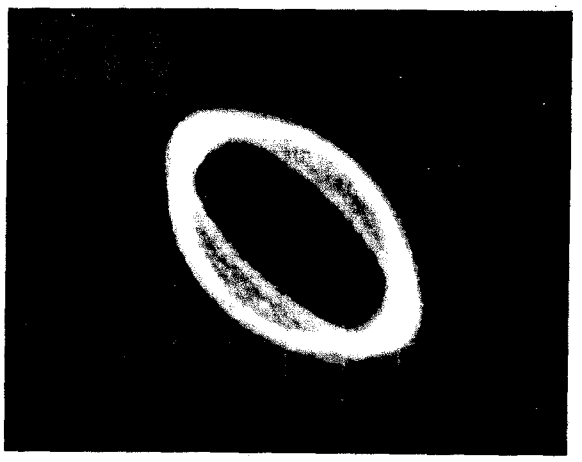
·**Measuring Equipment / Jig**	·Oscilloscope, Two L.P.F., Clock Driver
·**Measuring Point**	·E, F
·**Test Disc , Mode**	·ABEX TCD-784 (or SONY TYPE 4), TEST MODE
·**Adjustment Point**	·Grating hole

Main Unit



Adjustment Procedure
1.Load disc and switch regulator on.
2.Position the PU unit in the center of the disc using the **REV or FF** keys.
3.Press key **RPT** to close focus and press once more to close spindle.
4.Input the L.P.F. output of E to the X axis, and L.P.F. output of F to the Y axis of an oscilloscope by the AC mode, observe lissajous, and check that the grating is within ±45°. (See Waveform 1–3).
5.If the grating is over 45°, make a fine adjustment by slowly turning the screw driver, so that the lessajous is in line. If, however during the adjustment the screw driver should be turned too much and the lessajous should become out of line, proceed to the next grating adjustment 2.

Lissajous figure (AC input)
Horizontal axis E 10mV/div.
Vertical axis F 10mV/div.

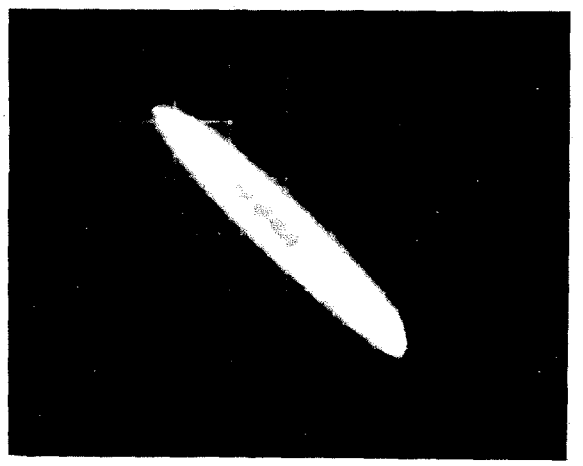


60°=NG

Waveform 1

45°=OK
(Limit)

Waveform 2



0°=BEST
(Doesn't become a single line due to eccentricity)

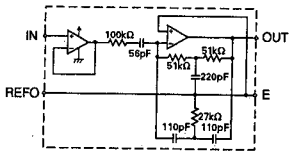
Waveform 3

3 Grating Adjustment 2

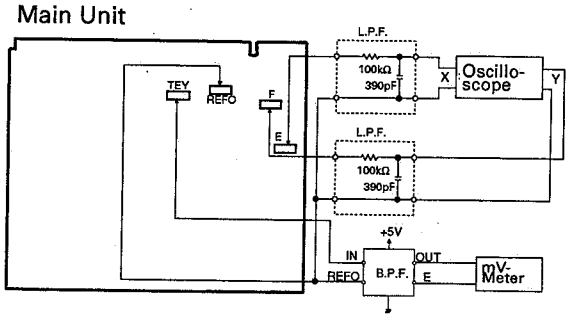
- **Purpose :**
  This needs to be done if the previous adjustment was unsuccessful.
- **Symptoms of Mal-adjustment :**
  Unable to play disc, track skipping, track search NG.

·Measuring Equipment / Jig	·Oscilloscope, Grating Adjustment filter (B.P.F.), mV Meter, Two L.P.F., Clock Driver
·Measuring Point	·TEY, E, F
·Test Disc , Mode	·ABEX TCD-784 (or SONY TYPE 4), TEST MODE
·Adjustment Point	·Grating hole

B.P.F.



Main Unit

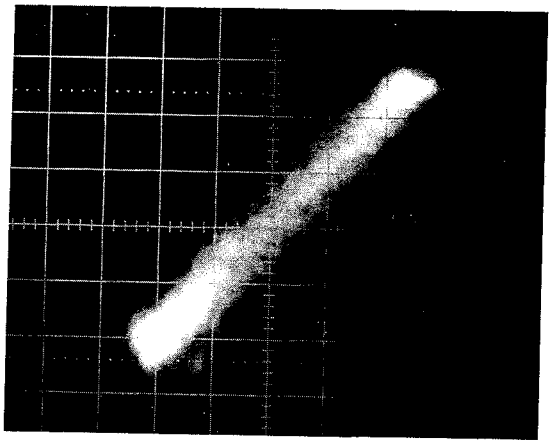


Adjustment Procedure

1. Load disc and switch regulator on.
2. Position the PU unit in the center of the disc using the **REV or FF** keys.
3. Press key **RPT** to close focus and press once more to close spindle.
4. While observing the TEY filter output using an ACmV meter, use a screwdriver to slowly turn the grating hole.
   The AC level, should become larger or smaller by turning the grating hole, try to find the minimum level point.
   (This is where the grating is in line on track, and is the "null point".)
5. Turn the screwdriver clockwise from the null point (from the PU under side), so that the lissajous is in line as much as possible.

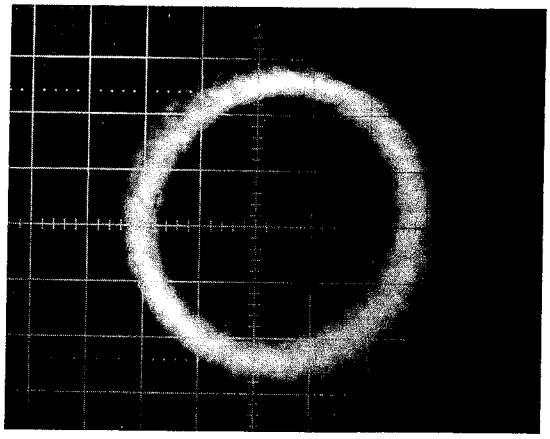
Lissajous figure (AC input)
Horizontal axis E 10mV/div.
Vertical axis F 10mV/div.

Null Point=180°



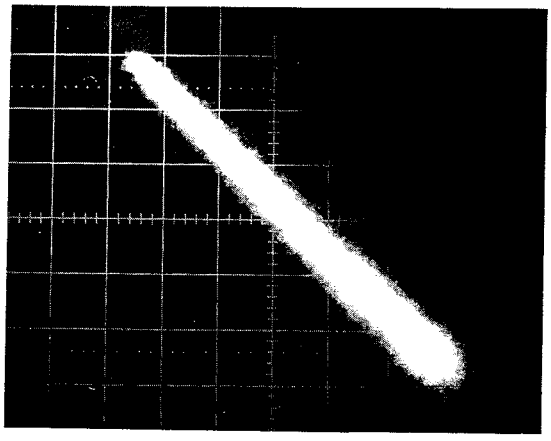
Waveform 4

"Rough" adjustment=90°



Waveform 5

Final adjustment=0°



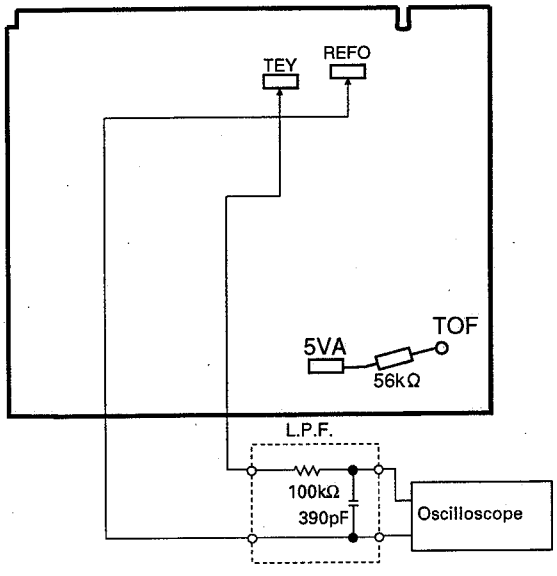
Waveform 6

4 Tracking Balance Adjustment 1

- **Purpose :**
  To equate the sensitivity of the F channel to that of the E channel.
- **Symptoms of Mal-adjustment :**
  Track search NG, poor playability, carriage runaway.

Measuring Equipment / Jig	Oscilloscope, L.P.F.
Measuring Point	TEY
Test Disc , Mode	ABEX TCD-784 (or SONY TYPE 4), TEST MODE
Adjustment Point	VR1002 (T.BAL VR)

Main Unit



Pull up the TOF terminal to the 5VA terminal with a 56kΩ resistor. (This is in order to cancel lens offset in the tracking direction.)

Adjustment Procedure

1. Load disc and switch the regulator on.
2. Position the PU unit in the center of the disc using the **REV or FF** keys.
3. Close focus by pressing key **RPT**.
4. Observing the TEY waveform on the oscilloscope, adjust VR1002 until the positive and negative halves have the same amplitude (see waveform 7–9).

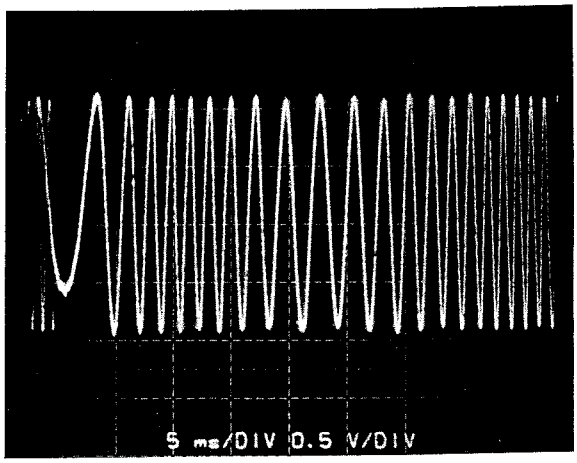
Check

After adjustment the TEY waveform should have an amplitude of 1.5±0.65 Vpp (ABEX TCD-784 or SONY TYPE 4)
(Providing focus bias is OK)

DC Mode
0.5V/div.
5ms/div.

+5% NG

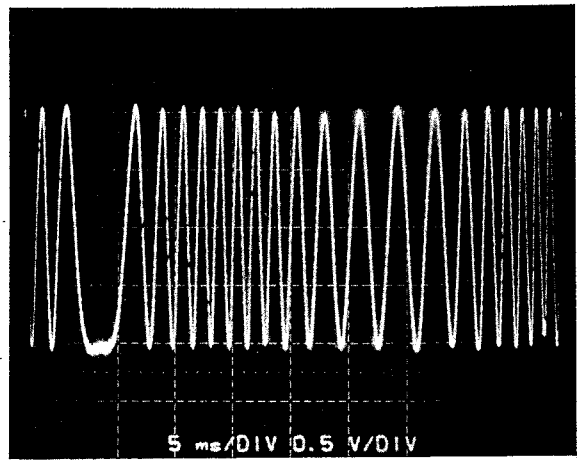
REFO →



Waveform 7

±0% OK

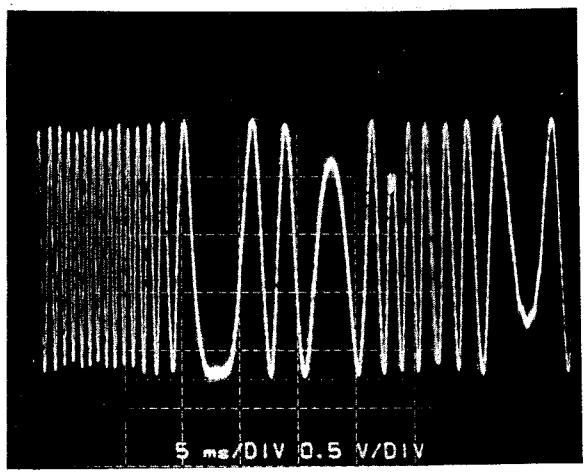
REFO →



Waveform 8

−5% NG

REFO →



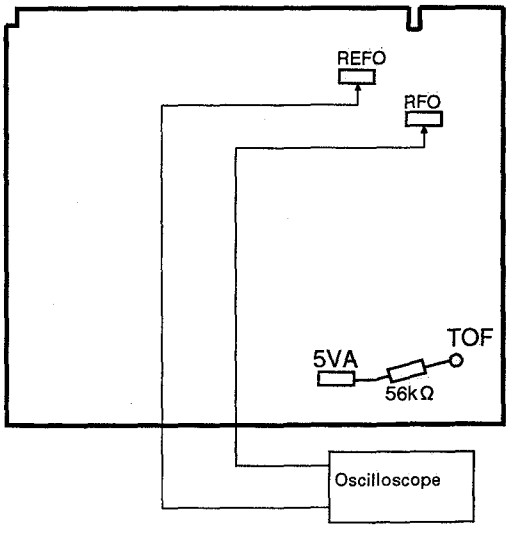
Waveform 9

5 Focus Bias Adjustment

· **Purpose :**
To adjust the focus servo reference so that the RF waveform is an optimum.
· **Symptoms of Mal-adjustment :**
Difficulty in closing focus, poor playability.

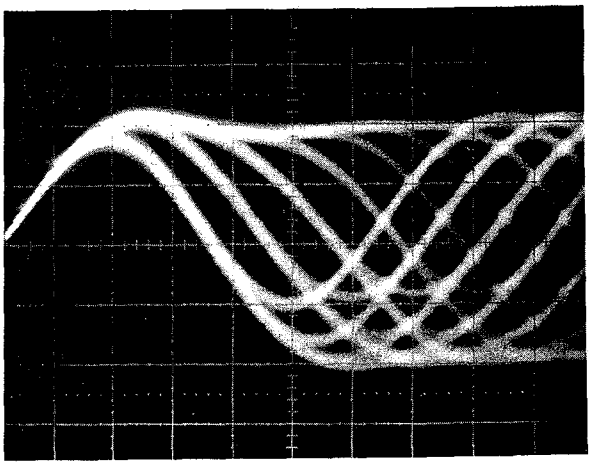
· **Measuring Equipment / Jig**	· Oscilloscope
· **Measuring Point**	· RFO
· **Test Disc , Mode**	· ABEX TCD-784 (or SONY TYPE 4), NORMAL MODE
· **Adjustment Point**	· VR1003 (FE BIAS VR)

Main Unit



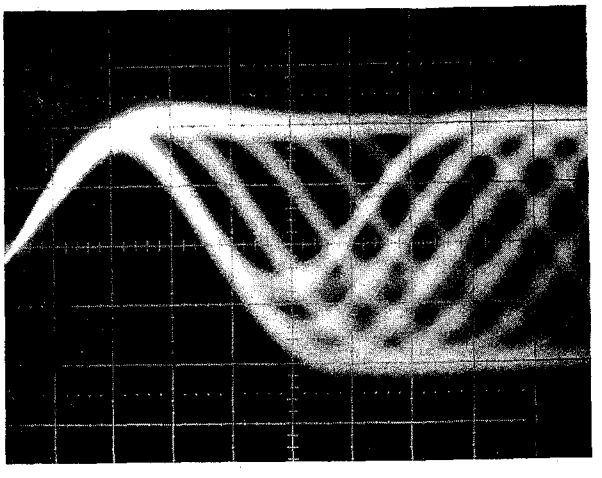
Pull up the TOF terminal to the 5VA terminal with a 56kΩ resistor. (This is in order to cancel lens offset in the tracking direction.)

Adjustment Procedure
1.Play track number 18.
2.Observe the RFO from REFO on an oscilloscope, and adjust VR1003 (FE BIAS) so that the RF waveform is maximum and eye pattern is optimum. (See waveform 10, 11)
Check
After adjustment the RFO waveform should have an amplitude of 1.7±0.65 Vpp (ABEX TCD-784 or SONY TYPE 4)
3.Remove the pull-up resistor after completing adjustment.



OK

Waveform 10



NG

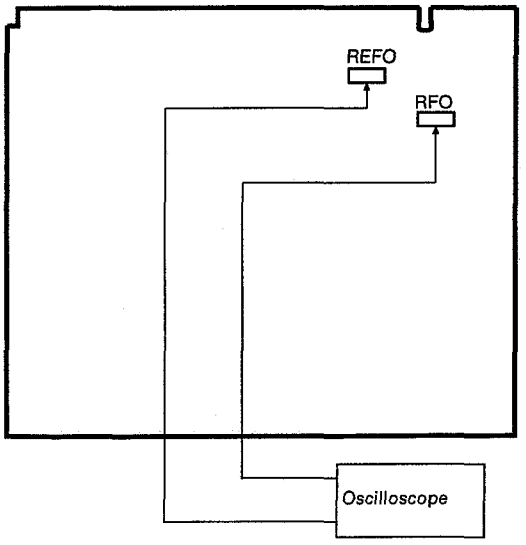
AC Mode Before adjustment Waveform 11

6 RFO Offset Adjustment

·Purpose
To adjust the RFO waveform offset to an optimum.
·Symptoms of Mal-adjustment
Difficulty in closing focus, poor playability.

·Measuring Equipment / Jig	·Oscilloscope
·Measuring Point	·RFO
·Test Disc , Mode	·ABEX TCD-784 (or SONY TYPE 4), NORMAL MODE
·Adjustment Point	·VR1004 (RFO OFFSET VR)

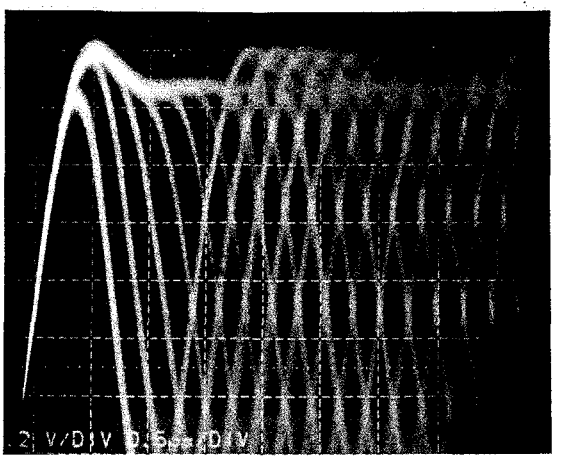
Main Unit



Adjustment Procedure
1.Make sure the TOF terminal's pull-up resistor has been disconnected.
2.Play track number 18.
3.Adjust VR1004 so that the peak value of the upper envelope of the RFO waveform is at +1.1VDC w.r.t. REFO (See waveform 12–14).

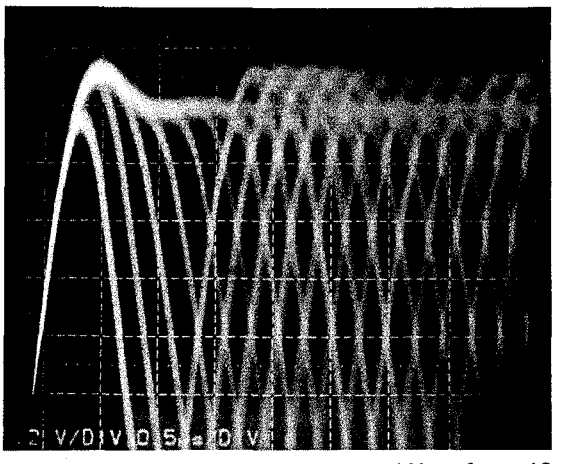
DC Mode
0.2V/div.
0.5µs/div.

+100mV NG



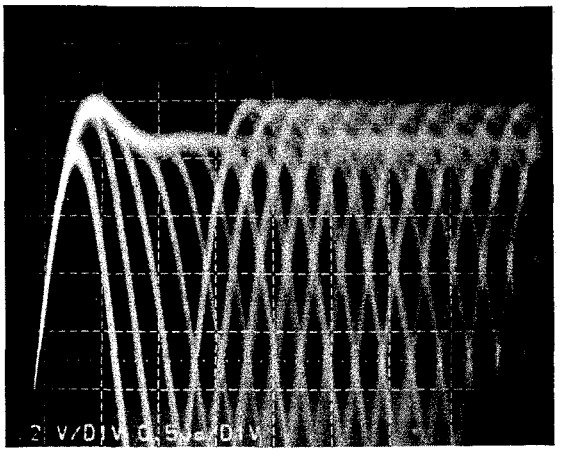
Waveform 12

OK



Waveform 13

-100mV NG



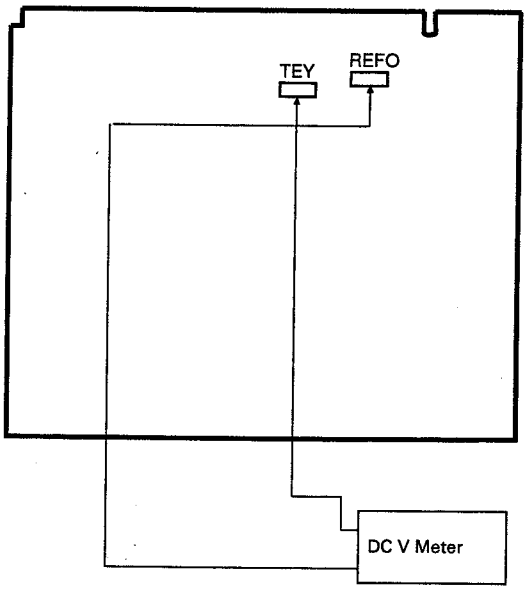
Waveform 14

7 Tracking Error Offset Adjustment 2

·**Purpose :**
To check the offset of the tracking pre-amp is zero and adjust if necessary.
·**Symptoms of Mal-adjustment :**
Track search NG, carriage runaway, poor playability.

·**Measuring Equipment / Jig**	·DC V Meter
·**Measuring Point**	·TEY
·**Test Disc , Mode**	·No disc, TEST MODE
·**Adjustment Point**	·VR1001(TE OFFSET VR)

Main Unit



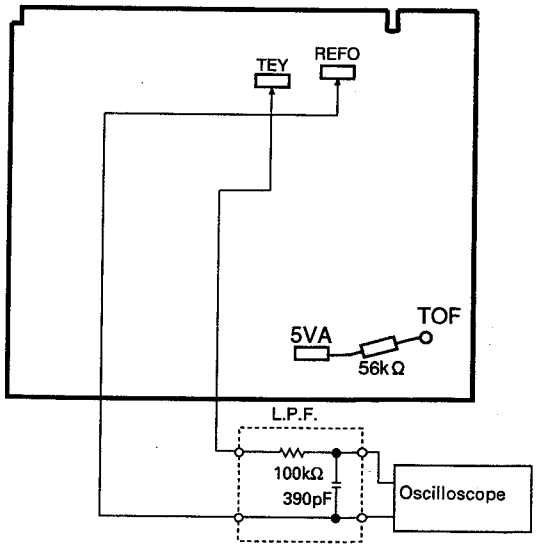
Adjustment Procedure
1.Switch the regulator on.
2.Confirm that the DC voltage of TEY from REFO is 0±25mV.
3.If not, readjust and proceed to tracking balance adjustment 2.

8 Tracking Balance Adjustment 2

·**Purpose :**
To equate the sensitivity of the F channel to that of the E channel.This needs only be done if the TE OFF-SET volume was re-adjusted in the previous step.
·**Symptoms of Mal-adjustment:**
Track search NG, poor playability, carriage runaway.

·**Measuring Equipment / Jig**	·Oscilloscope, L.P.F.
·**Measuring Point**	·TEY
·**Test Disc , Mode**	·ABEX TCD-784 (or SONY TYPE 4), TEST MODE
·**Adjustment Point**	·VR1002 (T.BAL VR)

Main Unit



Pull up the TOF terminal to the 5VA terminal with a 56kΩ resistor. (This is in order to cancel lens offset in the tracking direction.)

Adjustment Procedure
1.Load disc and switch the regulator on.
2.Position the PU unit in the center of the disc using the **REV or FF** keys.
3.Close focus by pressing key **RPT.**
4.Observing the TEY waveform on the oscilloscope, adjust VR1002 until the positive and negative halves have the same amplitude (See waveform 7–9).
Check
After adjustment the TEY waveform should have an amplitude of 1.5±0.65 Vpp (ABEX TCD-784 or SONY TYPE 4)
5.Remove the pull-up resistor after completing adjustment.

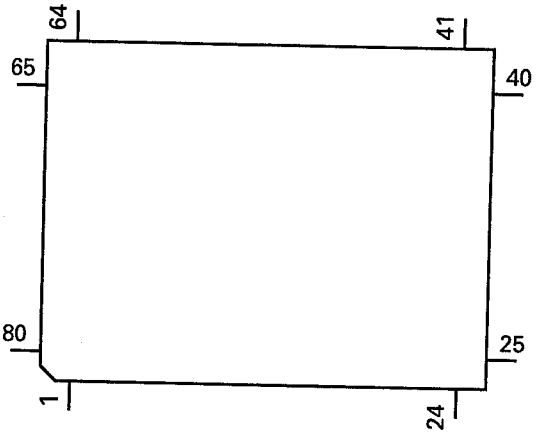
6. IC INFORMATION

● **Pin Functions (PD5384A)**

Pin No.	Pin Name	I/O	Format	Function and Operation
1	$\overline{\text{TIN}}$	I		Disc sensor timing input
2	NC			Not used
3	VDIN			Power supply short sensor
4	$\overline{\text{CLAMP}}$	I		Tray position input
5-7	NC			Not used
8	AO	O	N	Control signal distinguishing from LSI
9	XSCK	I/O	N	LSI clock input/output
10	XSO	O	N	LSI data output
11	XSI	I		LSI data input
12	$\overline{\text{STB}}$	O	C	LSI strobe output
13	$\overline{\text{RST}}$	O	C	LSI reset output
14	NC			Not used
15	DACRST	O	C	D/A converter reset output
16	$\overline{\text{CDBSENS}}$	I		CD Bsense input (CD)
17	DONINT	I		↓ Edge sense input
18	DOFINT	I		↑ Edge sense input
19	$\overline{\text{BSENS}}$	I		Back up sense input (E&C)
20	DMUTE	O	C	Digital mute output
21	$\overline{\text{DOPNSW}}$	I		Door keep open switch input
22	$\overline{\text{DCLSSW}}$	I		Door keep close switch input
23	ECOUT	O	C	E&C Bus data output
24	$\overline{\text{ECIN}}$	I		E&C Bus data intrude input
25	$\overline{\text{MAG}}$	I		Magazine lock switch intrude input
26	NC			Not used
27	$\overline{\text{RESET}}$	I		Reset input
28	POWER	O	C	CD +5V control
29	CONT	O	C	Servo driver power supply control
30	XIN	I		Crystal oscillating element connection pin
31	XOUT	O		Crystal oscillating element connection pin
32	VSS			GND
33-40	NC			Not used
41	MUTEP	O	C	MUTE output for audio MUTE
42	AUDOUT	O	C	AUDIO bus connection control
43	DET	O	C	Watchdog reset pulse output
44	WD1	O	C	Watchdog power supply control output
45	WD2	O	C	Watchdog reset pulse mask
46	SWD	O	C	BATT detect circuit ON/OFF
47	DORILM	O	C	Door illumination output
48	NC			Not used
49	PEEOUT	O	C	Test tone circuit connect/unconnect
50	NC			Not used
51	ECKO	O	C	E-bit check output
52	ECKI	I		E-bit check input
53	DCE	O	C	Compression CE
54	DRST	O	C	Compression IC reset output
55,56	NC			Not used
57	$\overline{\text{EJP}}$	I		Reset position switch
58,59	NC			Not used
60	MIRR	I		Mirror detector input
61	LOCK	I		Spindle lock detector input
62	FOK	I		FOK signal input
63	$\overline{\text{HOME}}$	I		Home position detector input
64	NC			Not used
65	LOAD	O	C	Mechanism power supply control

Pin No.	Pin Name	I/O	Format	Function and Operation
66	I3	O	C	Motor driver control output
67	I1	O	C	Motor driver control output
68	I2	O	C	Motor driver control output
69	I4	O	C	Motor driver control output
70	CDMUTE	O	C	CD mute output
71	$\overline{\text{ADENA}}$	O	C	A/D reference voltage output
72	$\overline{\text{TESTIN}}$	I		Test program mode input
73	VCC			Back up 5V
74	VREF	I		A/D converter reference voltage input
75	AVSS			A/D GND
76,77	NC			Not used
78	$\overline{\text{DISK}}$			Disc detector , 8/12cm detect
79	$\overline{\text{TSEL}}$			Tray position detector photo sensor
80	SMUTE	O	C	DAC soft mute output

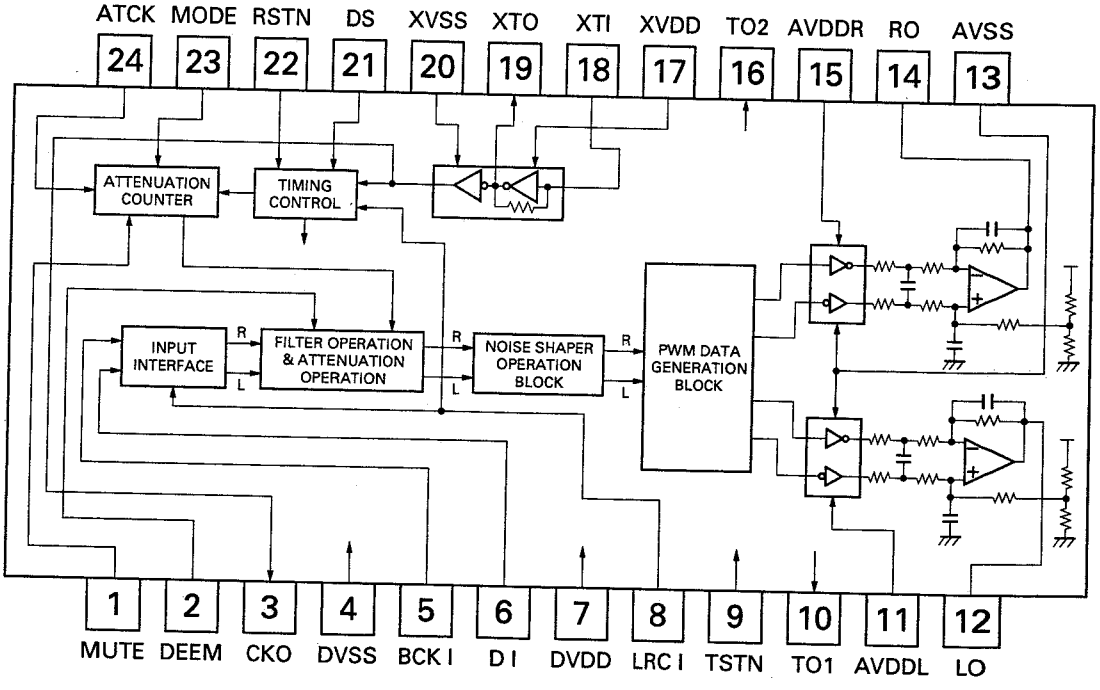
*PD5384A



IC's marked by are MOS type.*
Be careful in handling them because they are very liable to be damaged by electrostatic induction.

Format	Meaning
C	C MOS
N	N channel open drain

SM5875AMP


ATCK MODE RSTN DS XVSS XTO XTI XVDD TO2 AVDDR RO AVSS
24 23 22 21 20 19 18 17 16 15 14 13
ATTENUATION COUNTER
TIMING CONTROL
INPUT INTERFACE
FILTER OPERATION & ATTENUATION OPERATION
NOISE SHAPER OPERATION BLOCK
PWM DATA GENERATION BLOCK
R
L
1 2 3 4 5 6 7 8 9 10 11 12
MUTE DEEM CKO DVSS BCK I D I DVDD LRC I TSTN TO1 AVDDL LO

7. ELECTRICAL PARTS LIST

NOTES:

- Parts whose parts numbers are omitted are subject to being not supplied.
- The part numbers shown below indicate chip components.

Chip Resistor

RS1/○S○○○J,RS1/○○S○○○J

Chip Capacitor (except for CQS.....)

CKS....., CCS....., CSZS.....

=====Circuit Symbol & No. Part Name=====		Part No.
Unit Number : CWX1868		
Unit Name : Main Unit		
MISCELLANEOUS		
IC 1001		UPC2571GS
IC 1201		UPD63700GF1
IC 1301		PD4501A
IC 1401		XRA6797FP
IC 1601		SM5875AMP
IC 1603		NJM78L05A
IC 1701		PD5384A
IC 1703		A2470L
IC 1704		PAJ001A
IC 1705		PA0054AM
IC 1801		LB1836M
Q 1001		2SA1015
Q 1401		2SB1238
Q 1701		DTA144ES
Q 1707 1801		DTA123JS
Q 1708 1802		DTC114YS
Q 1709 1712		2SA1036K
Q 1713 1716 1717		UN2211
Q 1714		2SD601A
Q 1715		UN2111
D 1401 1402 1403		ERA15-02VH
D 1704		MA151WA
D 1705		MA153
L 1601	Inductor	LCTB100K3216
L 1602	Inductor	CTF1357
L 1701	Coil	LCTB150K3216
X 1601	Crystal Resonator 16.9340MHz	CSS1328
X 1701	Ceramic Resonator 8.000MHz	CSS1107
VR1001	Semi-fixed 2.2kΩ(B)	CCP1177
VR1002	Semi-fixed 22kΩ(B)	CCP1183
VR1003 1004	Semi-fixed 47kΩ(B)	CCP1185
	Checker Chip	CKF1031
RESISTORS		
R 1001		RS1/8S120J
R 1002		RS1/8S100J
R 1003 1041 1411 1620 1702 1748 1754 1772 1785 1792		RS1/16S103J
R 1004 1013 1017 1024 1025 1034 1035 1039 1040 1303		RS1/16S102J
R 1005 1405		RS1/16S823J
R 1006		RS1/16S182J
R 1007		RS1/16S333J
R 1011 1012		RS1/16S683J
R 1014 1410 1777		RS1/16S473J
R 1018 1020		RS1/16S622J
R 1019 1401 1716		RS1/16S563J
R 1021		RS1/16S513J
R 1022 1029 1030 1409		RS1/16S133J
R 1027		RS1/16S183J
R 1028		RS1/16S822J

=====Circuit Symbol & No. Part Name=====		Part No.
R 1031 1032 1402 1403		RS1/16S153J
R 1036 1037 1038 1301 1413		RS1/16S221J
R 1042 1709 1710 1714 1722 1733 1734 1735 1744 1745		RS1/16S222J
R 1201 1407 1705 1713 1718 1731 1775 1783 1789		RS1/16S104J
R 1302		RS1/16S472J
R 1404		RS1/16S134J
R 1406		RS1/16S203J
R 1408		RS1/16S123J
R 1412		RS1/16S152J
R 1414		RS1/16S821J
R 1601		RS1/16S681J
R 1605 1606		RS1/16S331J
R 1621		RS1/16S104J
R 1703		RS1/16S221J
R 1704		RS1/16S154J
R 1708		RS1/16S432J
R 1712 1755 1756 1776 1788 1793		RS1/16S102J
R 1721 1730 1732 1773		RS1/16S105J
R 1774		RS1/16S474J
R 1779 1782		RS1/16S2003F
R 1780		RS1/16S823J
R 1781		RS1/16S823F
R 1786		RS1/10S105J
R 1787		RS1/10S514J
R 1801 1802		RS1/10S241J
R 1803 1804		RS1/10S151J
CAPACITORS		
C 1001 1008 1010 1011		CKSRYB102K50
C 1002		CEAS101M10
C 1003 1021		CKSQYB104K25
C 1004		CEAS470M10
C 1005		CCSRCH101J50
C 1006 1023		CKSRYB561K50
C 1007 1015 1201		CKSQYB334K16
C 1009		CCSRCH181J50
C 1013 1301 1617 1618 1702 1704 1705 1708 1709		CKSRYB103K50
C 1014		CCSRCH220J50
C 1016 1017		CKSQYB104K25
C 1018		CKSQYB334K16
C 1022		CKSRYB332K50
C 1202		CKSQYB104K16
C 1203		CCSRCH471J50
C 1302		CEA470M6R3LL
C 1401 1710 1711		CSZA220M10
C 1402		CKSQYB562K50
C 1403		CKSQYB822K50
C 1404 1405		CEAS221M10
C 1406		CKSRYB821K50
C 1407		CKSRYB471K50
C 1408		CCSRCH271J50
C 1409	22µF/16V	CCL1044
C 1602 1603 1604 1605		CKSQYB104K25

=====Circuit Symbol & No. Part	Name=====	Part No.
C 1606 1607		CCSRCH150J50
C 1608		CEA101M6R3LL
C 1609 1610		CKSRYB682K50
C 1701		CKSRYB473K16
C 1703		CEA2R2M50LL
C 1802		CEA220M16LL

Extension Unit
Consists of · Extension P.C.Board · Switch P.C.Board

Unit Number :
Unit Name : Extension Unit

MISCELLANEOUS

IC 1101		XRA4560F
IC 1103		TC74HC4053AF
Q 103 104		2SD1048
Q 1105 1107		UN2211
Q 1106		UN2111
Q 1110		2SD1048
Q 1501		2SB942
Q 1502 1503		2SD1859
D 1101		RD4R7M
D 1102 1103		MA151WK
D 1105		MA151WA
D 1107		RD18MB1
D 1501		SM-3-02LFEA
D 1502		ERA15-02VH
L 101 102	Inductor	LCTB6R8K3216
L 1102	Inductor	LCTB6R8K3216
L 1501	Choke Coil 1.4mH	CTH1129
S 1101	Switch (Reset)	CSG1053
S 1703	Switch(Open)	CSN1012
S 1704	Switch(Close)	CSN1025
IL 1701	Lamp 14V/65mA	CEL1350
EF 101 102	EMI Filter	CCG1067
EF1102	EMI Filter	CCG1067

RESISTORS

R 107 108 1112	RS1/10S104J
R 109 110 111 112 1121 1504	RS1/10S103J
R 113 114	RS1/8S151J
R 115 116	RS1/10S222J
R 117 118	RS1/10S164J
R 1109 1115	RS1/10S102J
R 1110 1111	RS1/10S224J
R 1113 1114	RS1/10S105J
R 1119	RS1/10S154J
R 1503 1505	RS1/8S201J
R 1506	RS1/8S241J
R 1507	RS1/10S681J
R 1508	RS1/10S511J

CAPACITORS

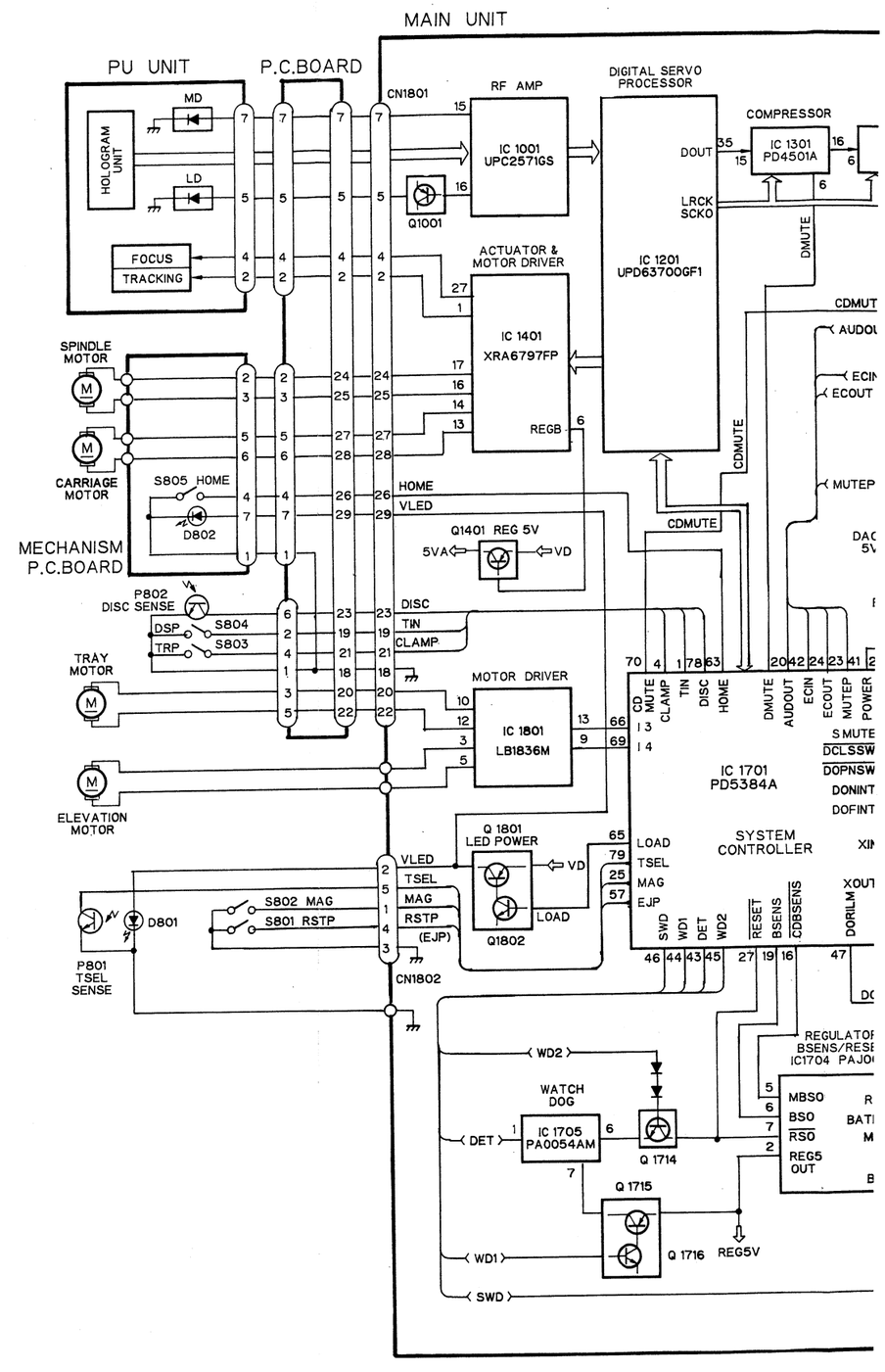
C 103 104 1108		CEA100M16LL
C 105 106		CCSQCH471J50
C 107 108		CCSQCH221J50
C 109 110		CEA220M10LL
C 111 112		CEA220M16LL
C 1106	47000µF/5.5V	CCL1015
C 1109 1113 1118 1120		CKSQYB103K50
C 1111		CEA220M16LL
C 1119		CCSQCH391J50
C 1121 1122 1508	470µF/16V	CCH1183
C 1501		CEA220M10LL
C 1509		CKCYB102K50

=====Circuit Symbol & No. Part	Name=====	Part No.
Unit Number :		
Unit Name	: P.C.Board	
C 801 802		CKSQYB102K50
Unit Number :		
Unit Name	: Mechanism P.C.Board	
D 802	LED	BR4361F
S 805	Switch(Home)	CSN1012

MISCELLANEOUS

D 801	LED	BR4361F
S 801	Switch(RSTP)	CSN1025
S 802	Switch(MAG)	CSN1012
	PU Unit	CGY1036
M 801	Motor Unit(Spindle)	CXA8217
M 802	Motor Unit(ELV)	CXA7272
M 803	Motor Unit(Tray)	CXA6977
M 804	Motor Unit(Carriage)	CXA4649
P 801 802	Photo-Transistor	PT4800
S 803 804	Switch(TRP,DSP)	CSN1012

8. BLOCK DIAGRAM



No.

)YB102K50

61F
012

51F
025
012
036
217

272
977
649
)0
012

8. BLOCK DIAGRAM

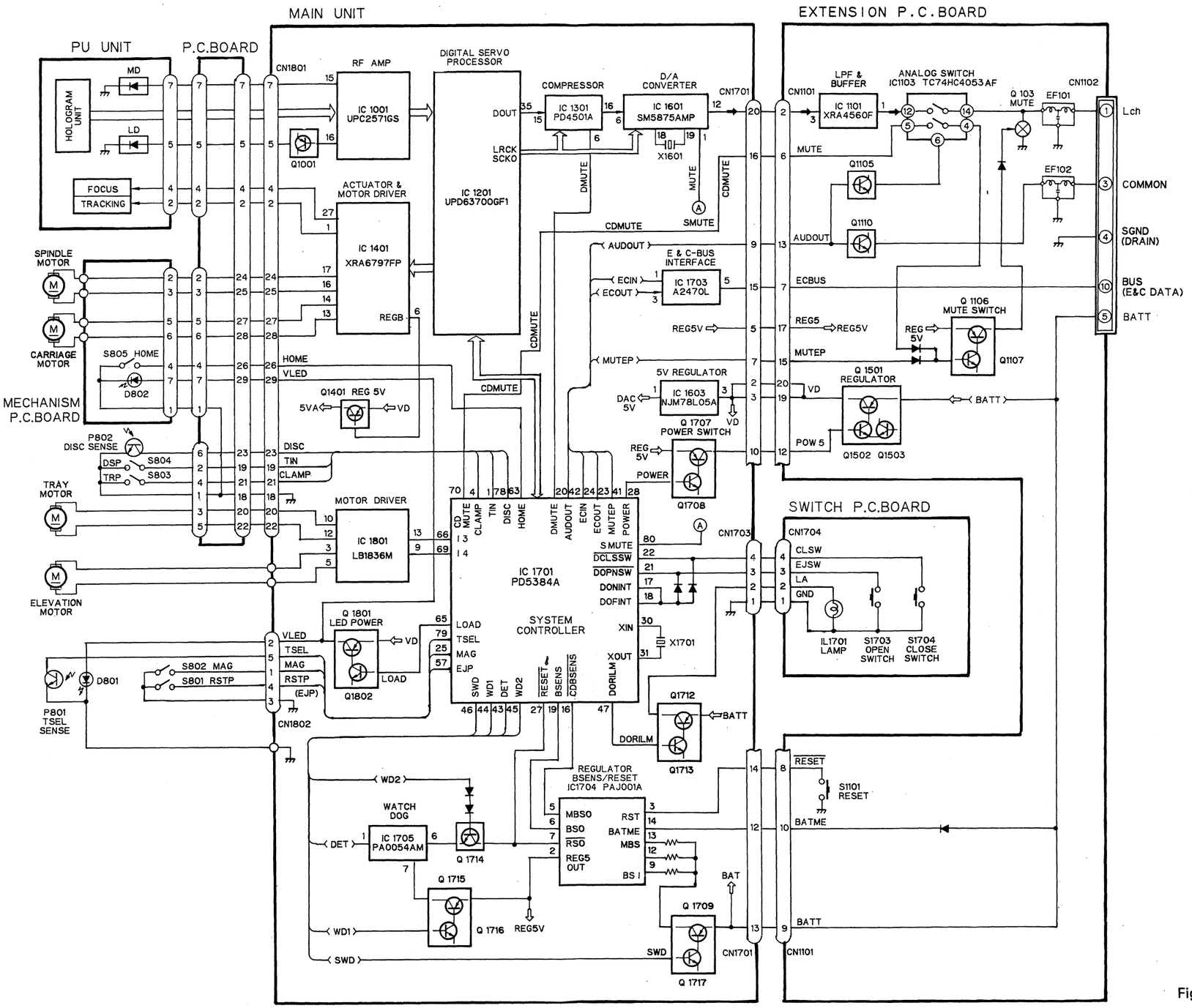
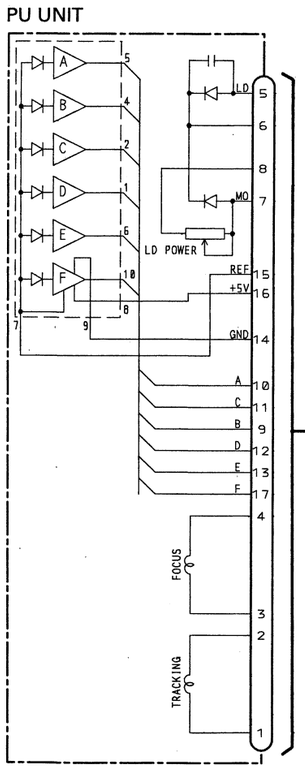
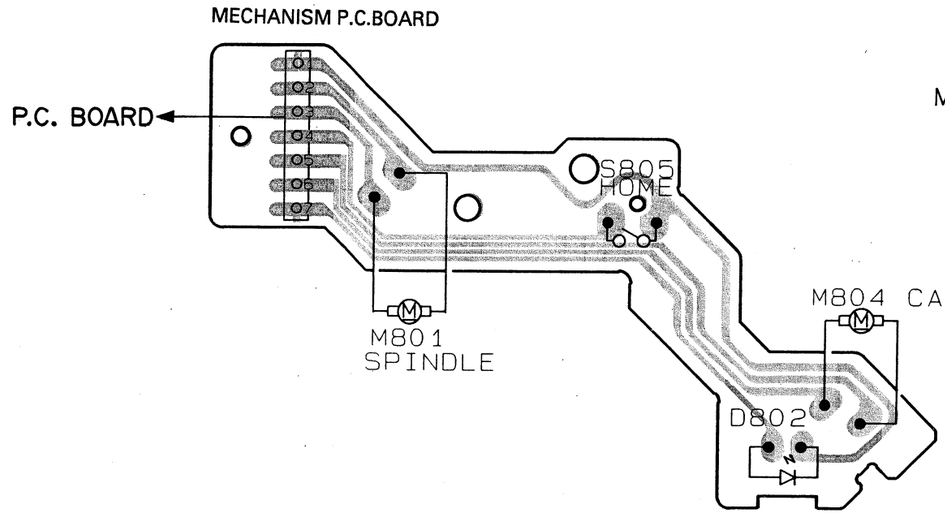
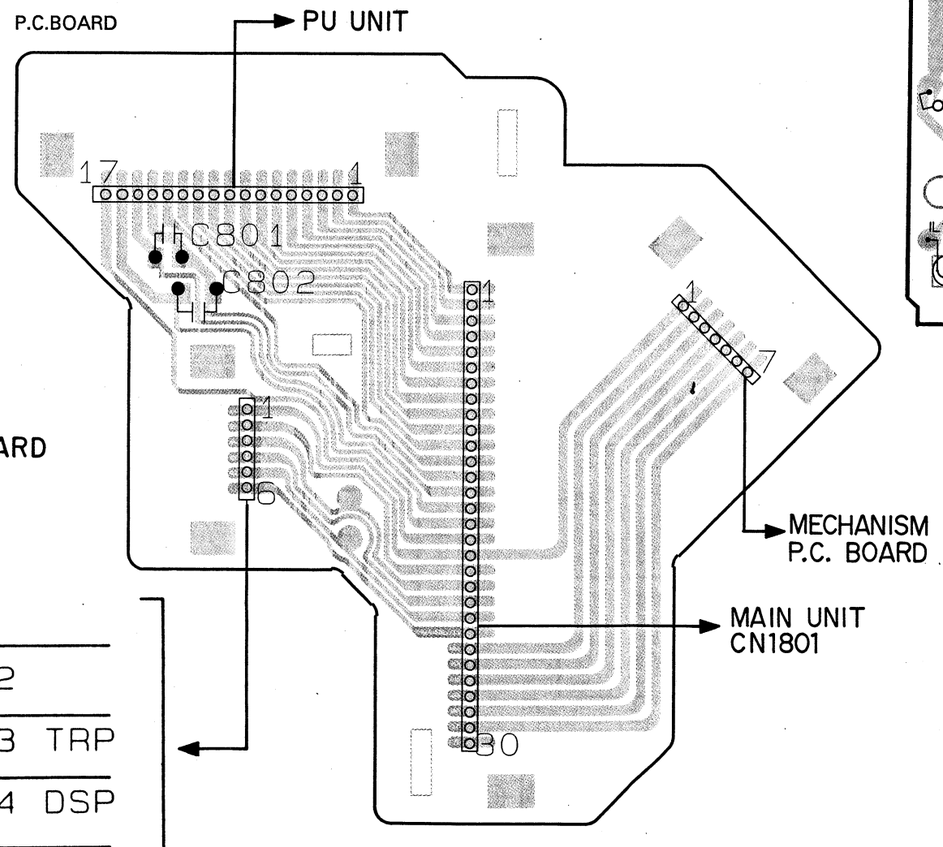


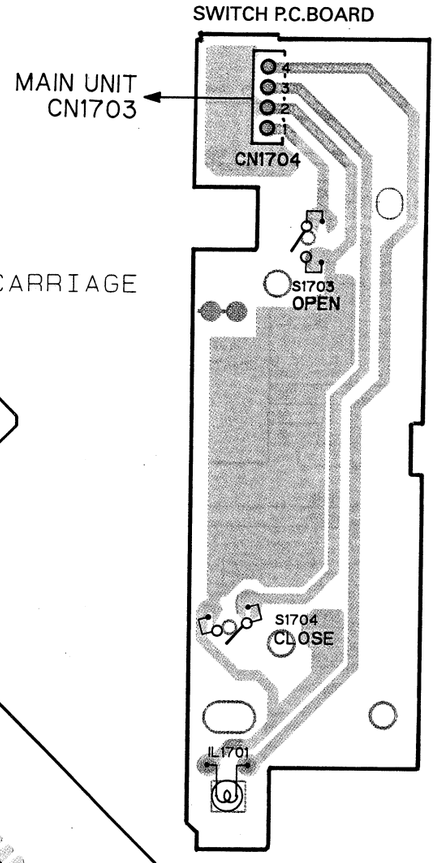
Fig. 6

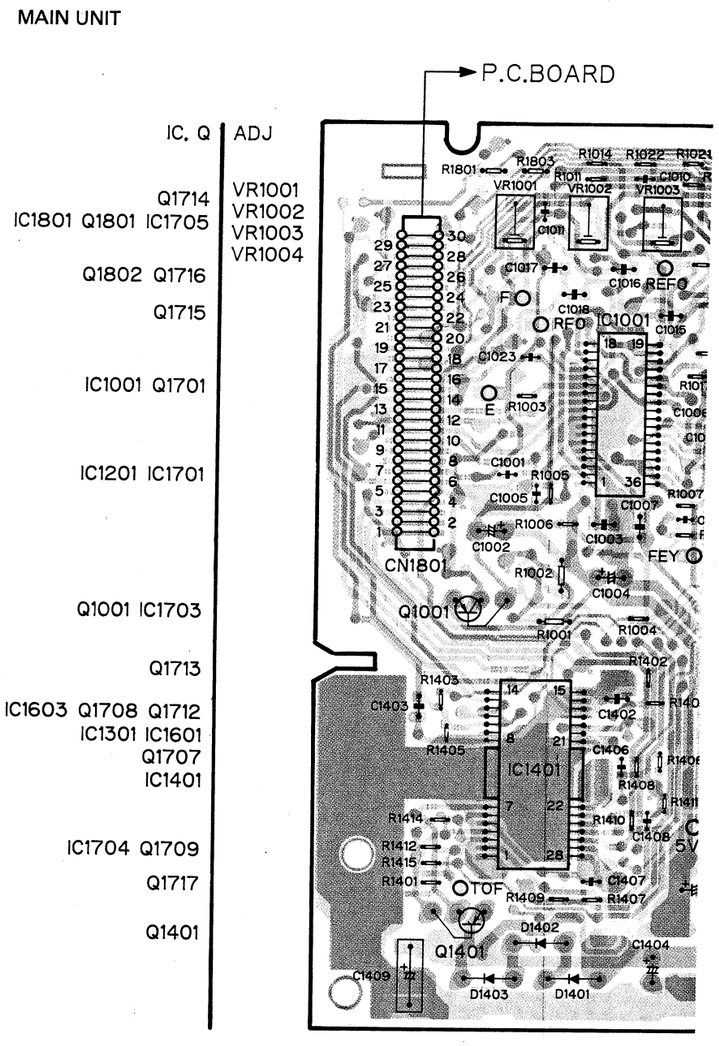
9. CONNECTION DIAGRAM





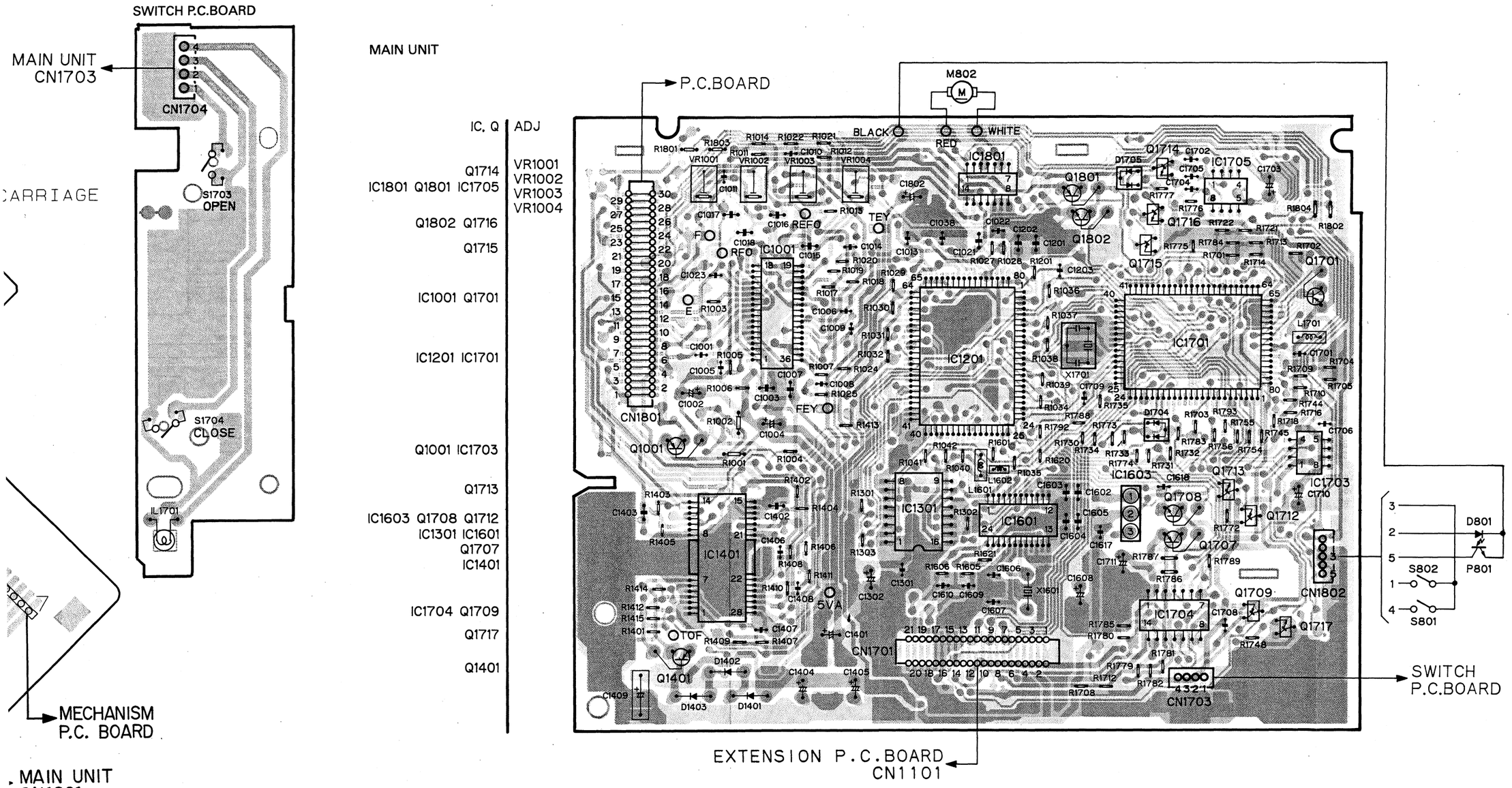






EXTENSION

NOTE:
The parts
For further

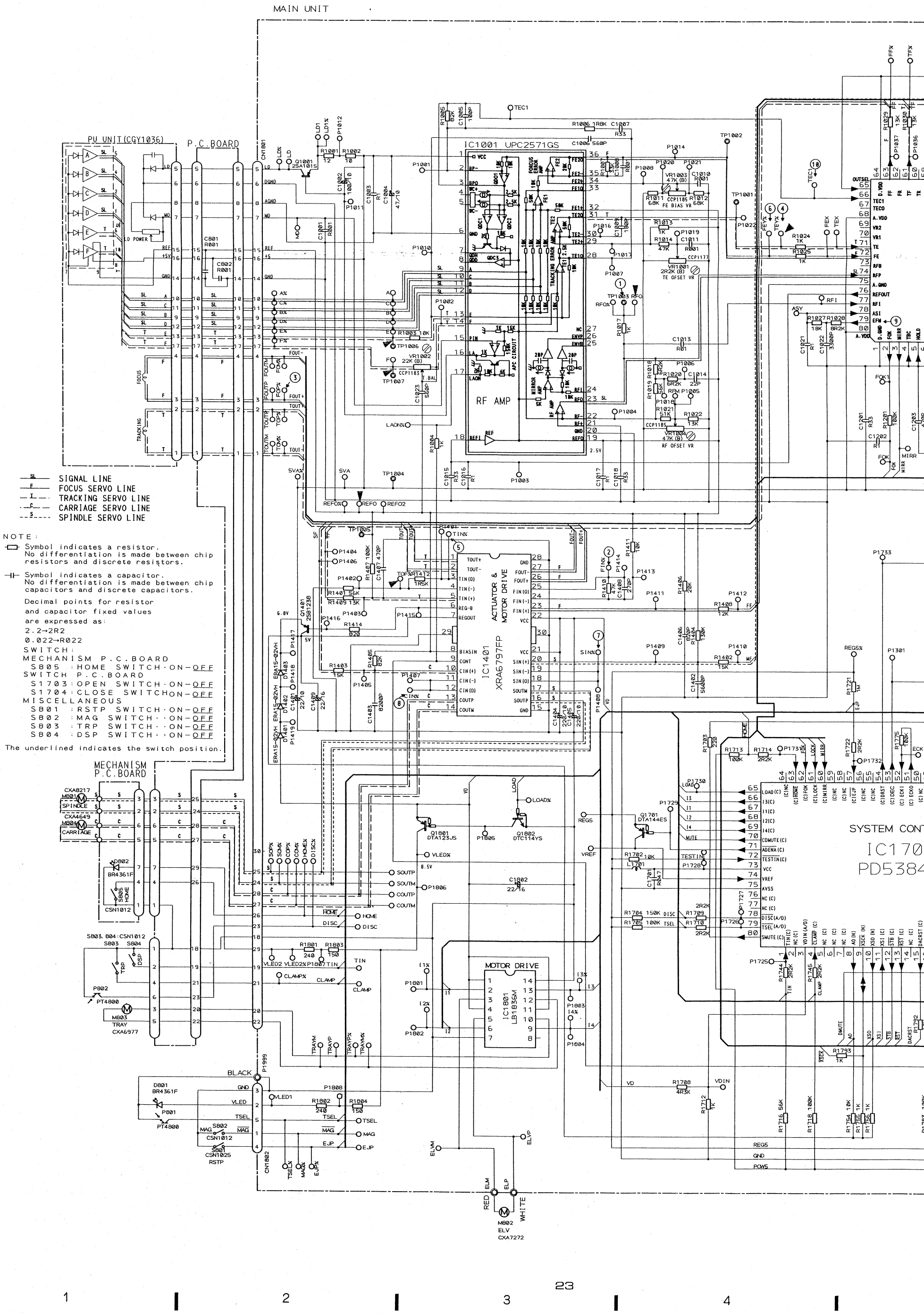


NOTE:

The parts mounted on this PCB include all necessary parts for several destinations.
For further information for respective destinations, be sure to check with the schematic diagram.

Fig. 7

10. SCHEMATIC CIRCUIT DIAGRAM



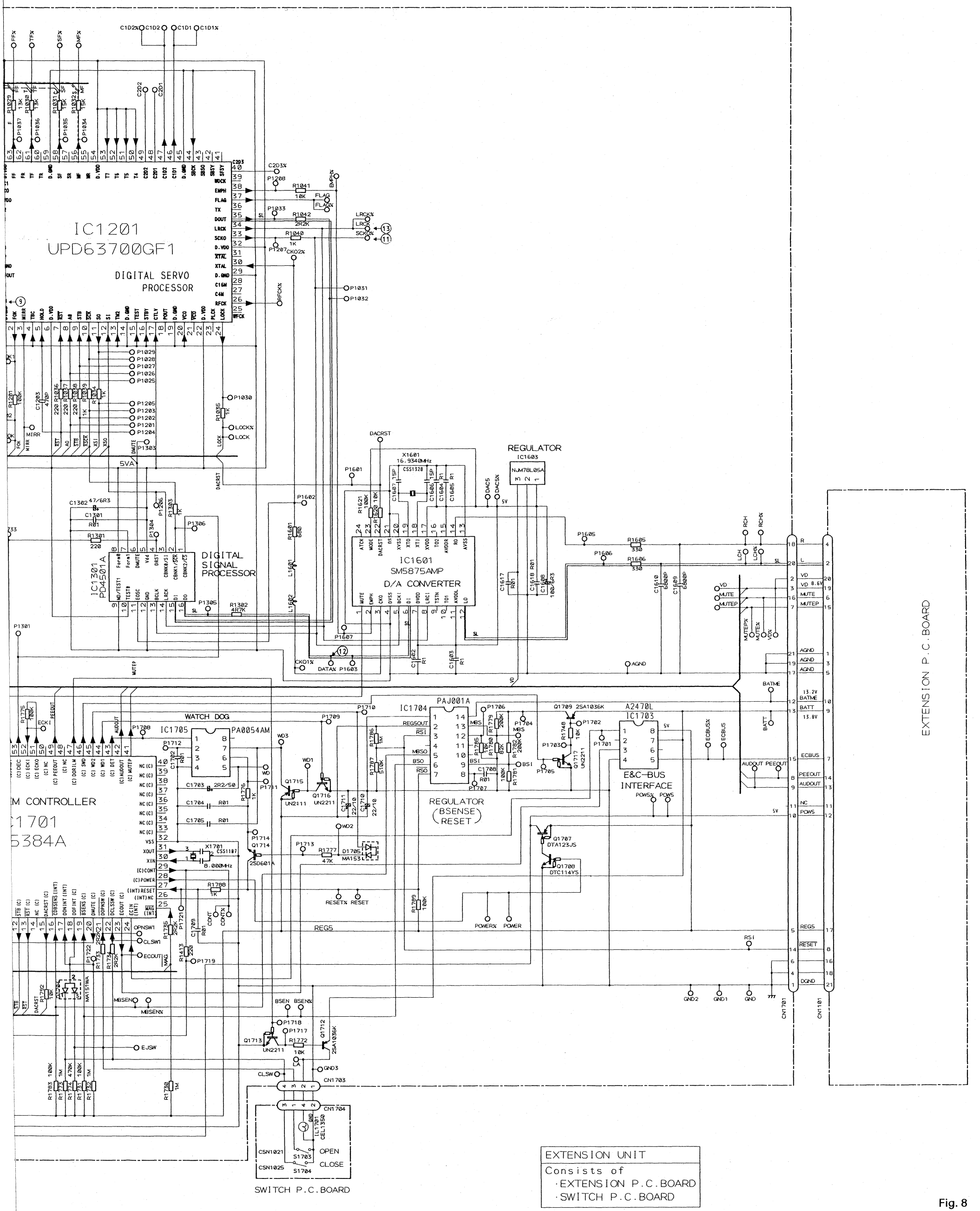

IC1201
UPD63700GF1
DIGITAL SERVO PROCESSOR
IC1301
PD4501A
DIGITAL SIGNAL PROCESSOR
IC1601
SM5875AMP
D/A CONVERTER
REGULATOR
IC1603
NJM78L05A
X1601
16.9340MHz
CSS1328
DACRST
5VA
WATCH DOG
IC1705
PA0054AM
IC1704
PAJ001A
REGULATOR
(BSENSE)
RESET
IC1703
A2470L
E&C-BUS
INTERFACE
EXTENSION P.C.BOARD
SWITCH P.C.BOARD
CN1701
CN1101
CN1703
CN1704
X1701
8.000MHz
CSS1187
Q1715
UN2211
Q1716
UN2211
Q1714
2SD601A
Q1707
DTA123JS
Q1708
DTC114YS
Q1709
2SA1036K
Q1717
UN2211
Q1712
2SA1036K
Q1713
UN2211
D1705
MA153
D1701
MA151WA
S1703
S1704
CEL1350
EXTENSION UNIT
Consists of
·EXTENSION P.C.BOARD
·SWITCH P.C.BOARD

Fig. 8

11. CIRCUIT DIAGRAM AND PATTERN

11.1 EXTENSION P.C.BOARD

● **Circuit Diagram**

EXTENSION P.C.BOARD

MAIN UNIT CN1701

CN1101

AGND 1 3 5

LCH 2

MUTE 6

REG5 17

RCH 4

POW5 12

BATT 9

BATME 10

VD 19 20

AUDOUT 13

PEEOUT 14

ECBUS 7

MUTEP 15

RESET 8

DGND 16 18 21

GND2 L1 L2 MUTE P25 R1 R2 BATME RST GND3

5.0V 4.4V 8.6V

LPF&BUFFER IC1101 XRA4560F

IC1103 TC74HC4053AF ANALOG SWICH

REGULATOR

D1502 ERA15-02VH

D1102 MA151WK

D1103 MA151WK

D1105 MA151WA

Q1105 UN2211

Q1106 UN2111

Q1107 UN2211

Q1501 2SB942

Q1502 2SD1859

Q1503 2SD1859

Q1108 2SD1848

Q1109 2SD1848

Q1104 2SD1848

MUTE

EMI FILTER

CN1102 L R COMMON SGND (DRAIN) BATT GND BUS (E&C DATA)

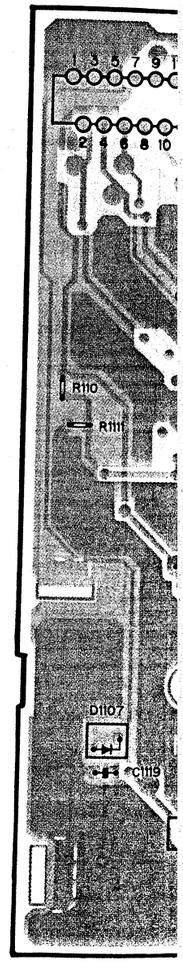
L1501 1.4mH

S1101 RESET SWITCH CSG1053

Fig. 9

● **Connection**

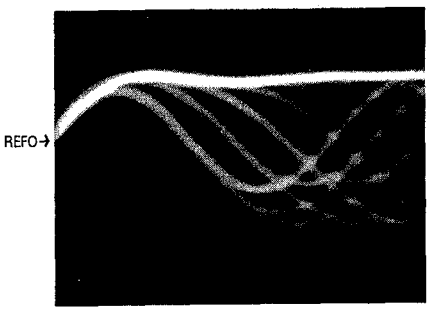
NOTE:
The parts mou
parts for sever
For further inf
sure to check v



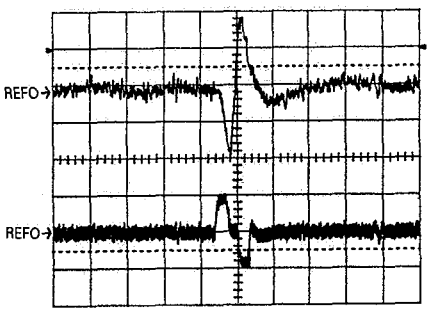
Note: 1. The encircled numbers denote measuring pointes in the circuit diagram.
2. Reference voltage
REFO: 2.5V

● Waveforms

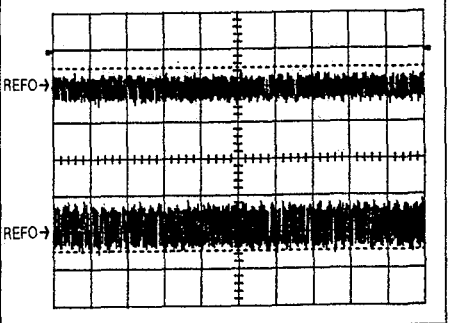
① RFO 0.5V/div. 0.2µs/div.
Normal mode: play



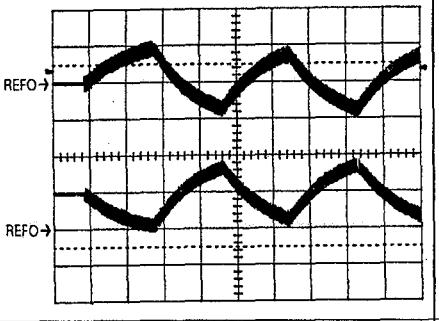
④ CH1: TEY 0.5V/div. 0.5ms/div.
⑤ CH2: TIN 1V/div.
Test mode: Single jump (FWD)



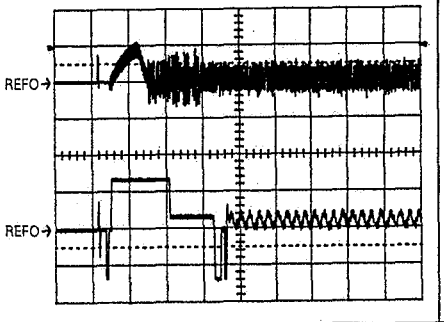
④ CH1: TEY 0.5V/div. 20ms/div.
⑤ CH2: TIN 0.5V/div.
Normal mode: Play



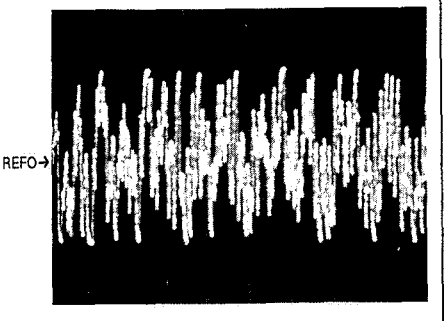
② CH1: FIN 1V/div. 0.2s/div.
③ CH2: FO+ 2V/div.
Test mode: No disc, Focus close



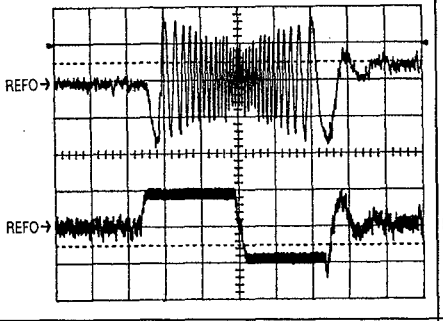
② CH1: FIN 1V/div. 0.5s/div.
⑦ CH2: SIN 1V/div.
Normal mode: Focus close (12cm)



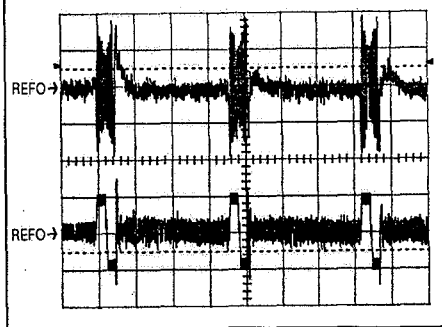
⑦ SIN 0.5V/div. 10ms/div.
Search (12cm disc)



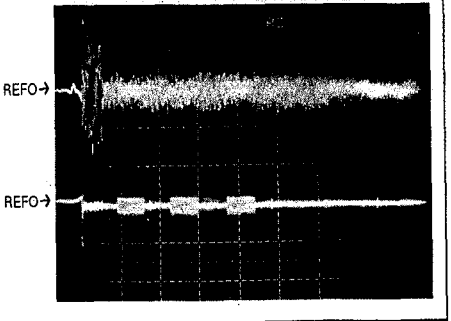
④ CH1: TEY 0.5V/div. 0.5ms/div.
⑤ CH2: TIN 1V/div.
Test mode: 32 track jump (FWD)



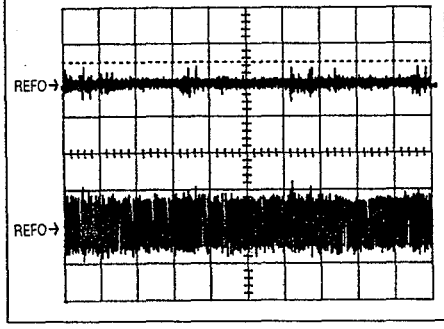
④ CH1: TEY 0.5V/div. 5ms/div.
⑤ CH2: TIN 1V/div.
Test mode: 100 track jump (FWD)



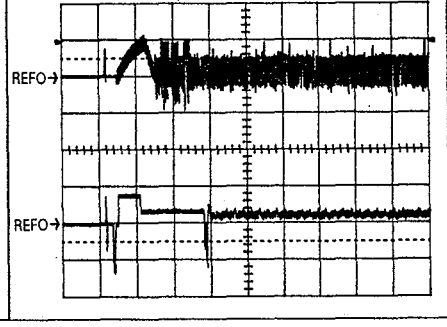
④ CH1: TEY 0.5V/div. 0.1s/div.
⑥ CH2: FEY 0.5V/div.
Normal mode: AGC after focus close



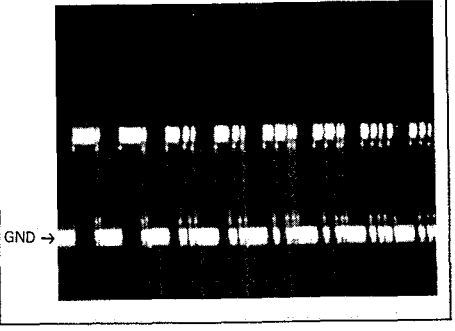
⑥ CH1: FEY 0.2V/div. 20ms/div.
② CH2: FIN 0.5V/div.
Normal mode: Play



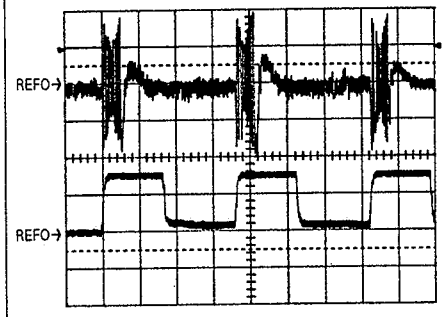
② CH1: FIN 1V/div. 0.5s/div.
⑦ CH2: SIN 1V/div.
Normal mode: Focus close (8cm)



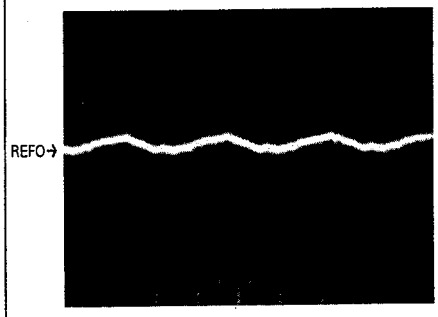
⑫ DATA 2V/div. 10µs/div.
Play



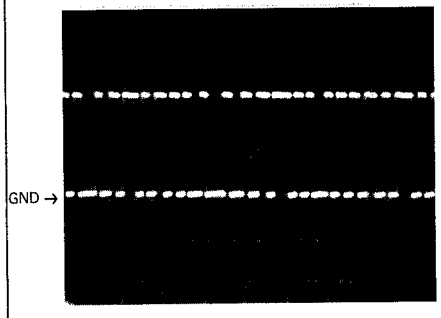
④ CH1: TEY 0.5V/div. 5ms/div.
⑧ CH2: CIN 0.5V/div.
Test mode: 100 track jump (FWO)



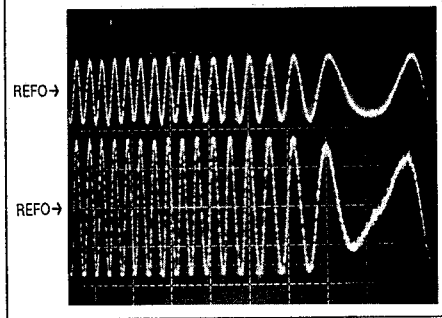
⑦ SIN 0.5V/div. 50ms/div.
Normal mode: 1Play (12cm disc)



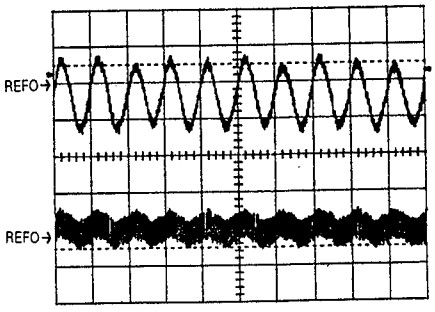
⑨ EFM 2V/div. 5µs/div.
Play



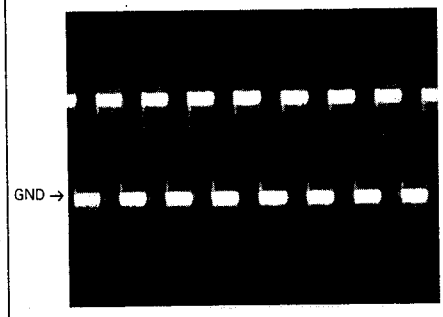
④ CH1: TEY 1V/div. 2ms/div.
⑩ CH2: TEC 1V/div.
Test mode: Focus closed
Tracking open



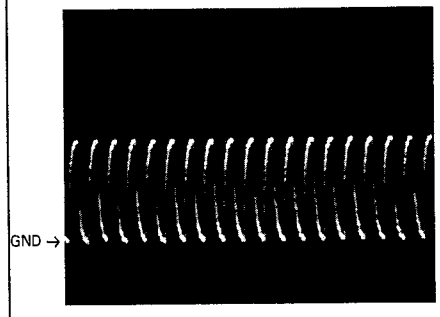
④ CH1: TEY 0.5V/div. 1ms/div.
⑤ CH2: TIN 0.5V/div.
Normal mode: During AGC



⑬ LRCK 2V/div. 20µs/div.
Play



⑪ SCKO 2V/div. 1µs/div.
Play



12. EXPLODED VIEW AND PARTS LIST

12.1 CHASSIS

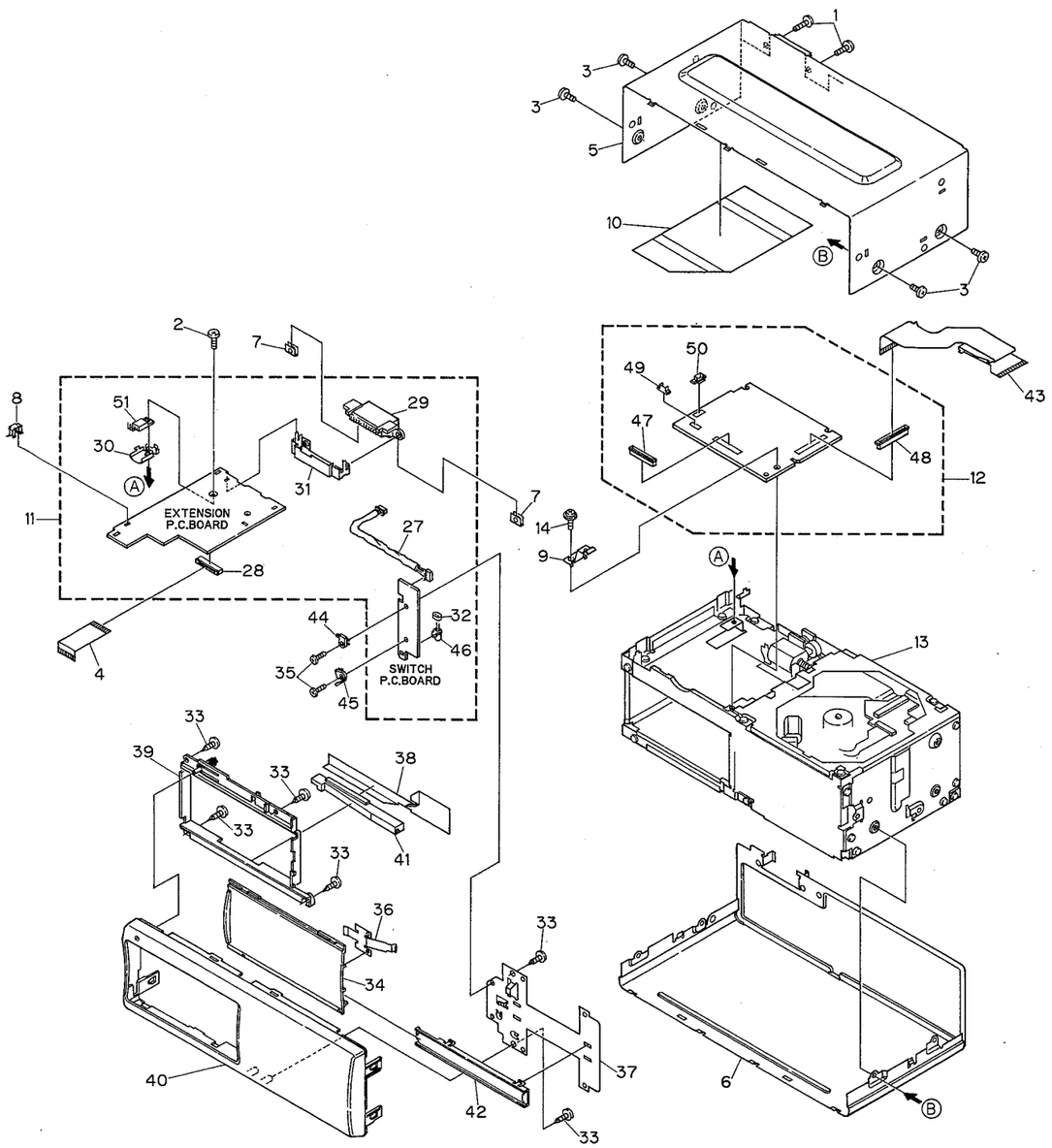


Fig. 11

NOTES:

●Parts marked by "＊"are generally unavailable because they are not in our Master Spare Parts List.

● **Parts List**

Mark	No.	Description	Part No.
	1	Screw	BMZ26P060FZK
	2	Screw	BMZ26P080FMC
	3	Screw	BMZ30P040FZK
	4	Connector	CDE4490
	5	Case	CNB1978
	6	Case	CNB1979
	7	Spacer	CNC5536
	8	Earth Plate	CNC5769
	9	Earth	CNC6340
	10	Insulator	CNM4473
	11	Extension Unit	CWX1906
	12	Main Unit	CWX1868
	13	CD Mechanism Unit	CXK4170
	14	Screw	IMS26P040FMC
15-26	·····		
	27	Connector(CN1704)	CDE4718
	28	Connector(CN1101)	CKS2224
	29	Connector(CN1102)	CKS2398
	30	Heat Sink	CNC4447
	31	Shield	CNC6047

Mark	No.	Description	Part No.
	32	Bush	CNV2858
	33	Screw	BPZ26P080FMC
	34	Door	CAT1691
	35	Screw	CBA1110
	36	Spring	CBL1162
	37	Holder	CNC6046
	38	Cover	CNM3795
	39	Sub Grille	CNS3651
	40	Grille	CNS3650
	41	Lens	CNV3413
	42	Rail	CNV3487
	43	P.C.Board	CNP3954
	44	Switch(S1703)	CSN1012
	45	Switch(S1704)	CSN1025
	46	Lamp(IL1701)	CEL1350
	47	Connector(CN1701)	CKS2770
	48	Connector(CN1801)	CKS2779
	49	Connector(CN1703)	CKS3126
	50	Connector(CN1802)	CKS3127
	51	Transistor(Q1501)	2SB942

12.2 CD MECHANISM UNIT

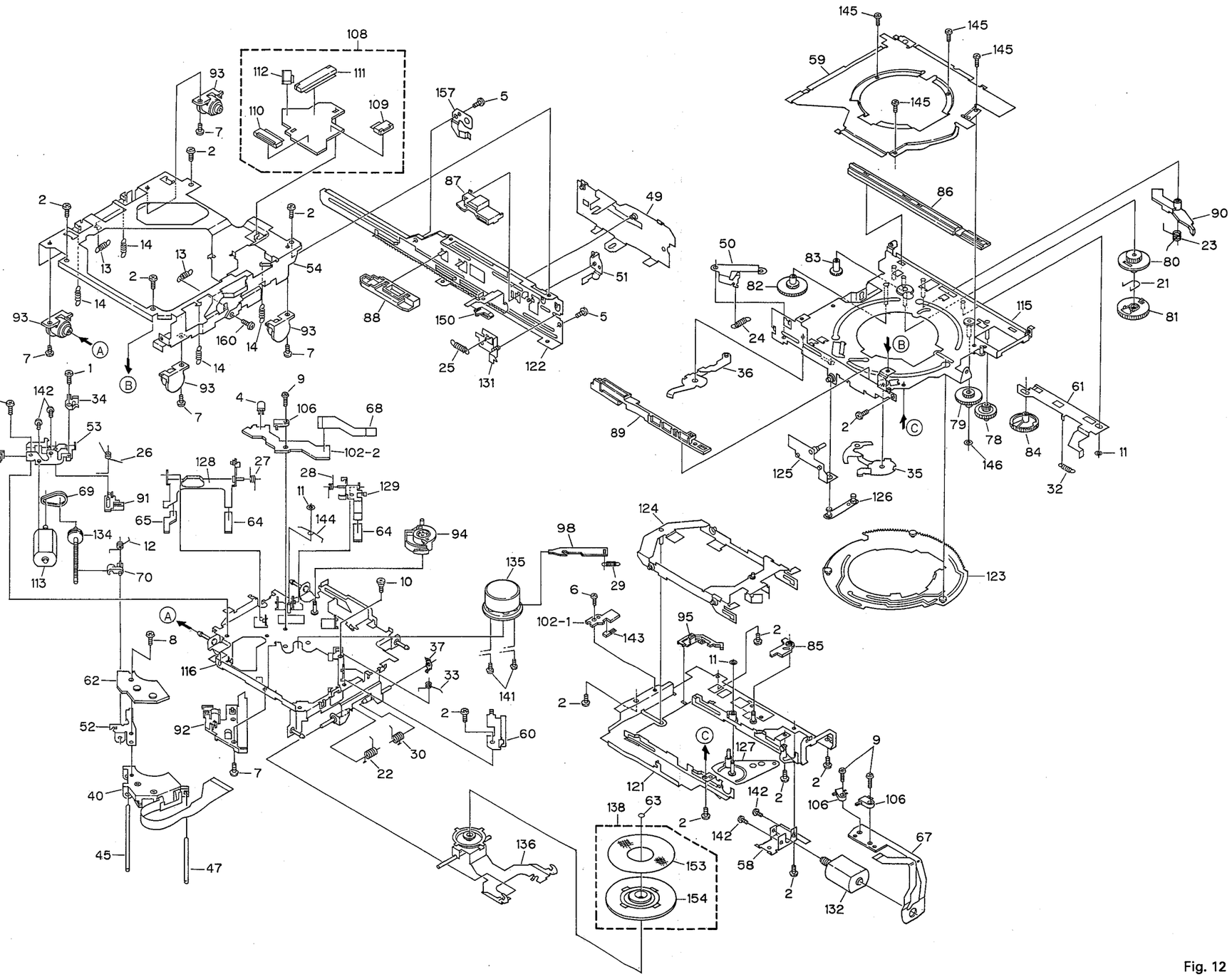


Fig. 12

● Parts List

Mark No.	Description	Part No.
1	Screw	BMZ20P030FMC
2	Screw	BMZ20P025FMC
3	Screw	CBA1065
4	LED	BR4361F
5	Screw	CBA1037
6	Screw	CBA1041
7	Screw	CBA1077
8	Screw	CBA1086
9	Screw	CBA1229
10	Screw	CBA1243
11	Washer	CBF1038
12	Spring	CBH1488
13	Spring	CBH1497
14	Spring	CBH1498
15,16	·····	
17	Spring	CBH1589
18	Spring	CBH1675
19	Spring	CBH1592
20	Spring	CBH1593
21	Spring	CBH1594
22	Spring	CBH1596
23	Spring	CBH1876
24	Spring	CBH1599
25	Spring	CBH1604
26	Spring	CBH1605
27	Spring	CBH1606
28	Spring	CBH1607
29	Spring	CBH1843
30	Spring	CBH1633
31	Spring	CBH1667
32	Spring	CBH1706
33	Spring	CBH1841
34	Spring	CBL1157
35	Arm	CBL1186
36	Arm	CBL1187
37	Spring	CBL1210
38	Spring	CBH1787
39	Spring	CBH1674
40	PU Unit	CGY1036
41	Spring	CBH1720
42	Connector	CDE4743
43	Link	CNC5584
44	Rear Frame	CNC5586
45	Shaft	CLA2027
46	Shaft	CLA2322

Mark No.	Description	Part No.
47	Shaft	CLA2345
48	Lever	CNC5590
49	Lever	CNC5166
50	Arm	CNC5168
51	Arm	CNC5169
52	Bracket	CNC5170
53	CM Bracket	CNC5171
54	Cover	CNC5587
55	Main Frame	CNC6087
56	Upper Frame Unit	CXA8857
57	Side Frame(R)	CNC6257
58	Bracket	CNC5462
59	Cover	CNC5567
60	Cover	CNC5576
61	Lever	CNC5678
62	Plate	CNC5782
63	Spacer	CNM1787
64	Sheet	CNM3897
65	Sheet	CNM4337
66	Insulator	CNM4266
67	P.C.Board	CNP6258
68	P.C.Board	CNP3730
69	Belt	CNT1047
70	Rack	CNV3355
71	Holder	CNV3363
72	Side Frame(L)	CNC6258
73	Bracket	CNC5988
74	Guide	CNV3756
75	Arm	CNV3757
76	Arm	CNV3758
77	Gear	CNV4331
78	Worm Wheel	CNV3761
79	Gear	CNR1382
80	Gear	CNV3763
81	Gear	CNV3764
82	Gear	CNV3765
83	Gear	CNV3766
84	Gear	CNV3767
85	Arm	CNV3769
86	Guide	CNV3770
87	Guide	CNV3771
88	Guide	CNV4470
89	Guide	CNV4557
90	Arm	CNV3775
91	Bearing	CNV3778

Mark No.	Description	Part No.
92	Holder	CNV3779
93	Damper	CNV3780
94	Cam	CNV4593
95	Guide	CNV3784
96	Guide	CNV3785
97	Arm	CNV3787
98	Plate	CNV3912
99	Gear	CNV4005
100	Gear	CNV4006
101	Gear	CNV4340
102	Composite P.C.Board	CNX2237
103	Rack	CNV4009
104	Arm	CNV4010
105	Guide	CNV4104
106	Switch	CSN1012
107	Switch	CSN1025
108	P.C.Board Unit	CWX1809
109	Connector(6P)	CKS1944
110	Connector(17P)	CKS1955
111	Connector(30P)	CKS1968
112	Connector(7P)	CKS2406
113	Motor Unit(M804)	CXA4649
114	·····	
115	Stage Chassis Unit	CXA6608
116	CRG Chassis Unit	CXA6609
117	Gear	CNV4004
118	Steer Unit	CXA7267
119	Bracket Unit	CXA8108
120	Magazine Holder Unit	CXA8856
121	Lower Cover Unit	CXA6614
122	Bracket Unit	CXA8178
123	Cam Ring Unit	CXA6616
124	Lever Unit	CXA6619
125	Lever Unit	CXA6620
126	Link Unit	CXA6621

Mark No.	Description	Part No.
127	Arm Unit	CXA6622
128	Arm Unit	CXA6623
129	Arm Unit	CXA6624
130	Frame Unit	CXA7271
131	Lever Unit	CXA8421
132	Motor Unit(M803)	CXA6977
133	Motor Unit(M802)	CXA7272
134	Screw Unit	CXA6990
135	Motor Unit(M801)	CXA8217
136	Arm Unit	CXA8957
137	Arm Unit	CXA7273
138	Clamer Unit	CXA7632
139	Damper Unit	CXA7450
140	Spring	CBL1216
141	Screw	JFZ17P025FNI
142	Screw	JFZ20P025FNI
143	Photo-Transistor (P801,802)	PT4800
144	Spring	CBH1741
145	Screw	JFZ20P014FMC
146	Washer	CBF1002
147	Spring	CBL1203
148	Screw	CBA1340
149	Arm	CNV4185
150	Guide	CNV4558
151	Composite P.C.Board	CNX2531
152	Composite P.C.Board	CNX2407
153	Sheet	CNM4071
154	Clamper	CNV3774
155	Plug	CKS3406
156	Screw	CBA1114
157	Spring	CBL1238
158	Spacer	CNC6435
159	Spring	CBL1285
160	Screw	CBA1371
161	Holder	CNV4486

● CD Mechanism Unit

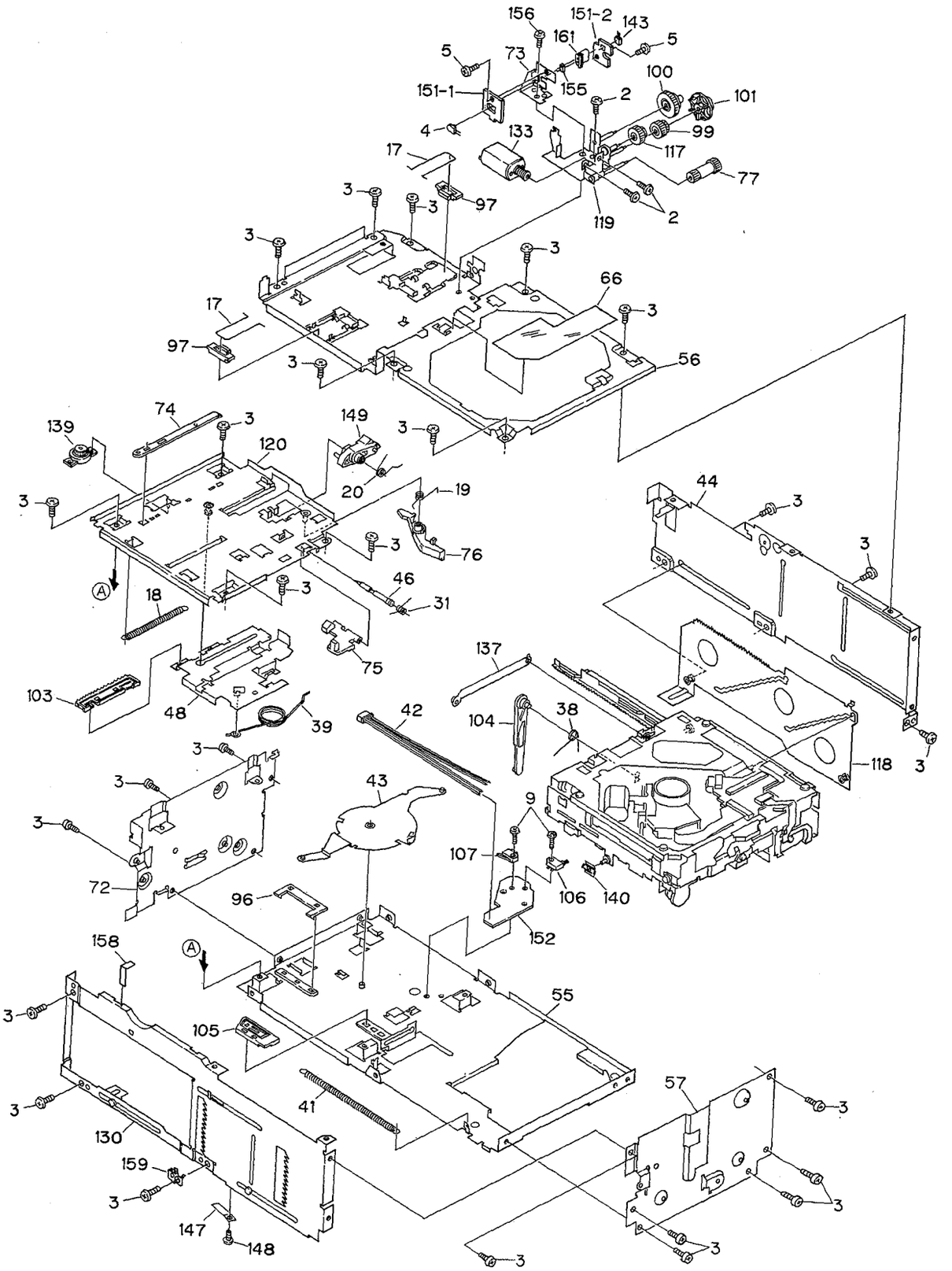


Fig. 13

12.3 MAGAZINE ASSY(CXA7122)

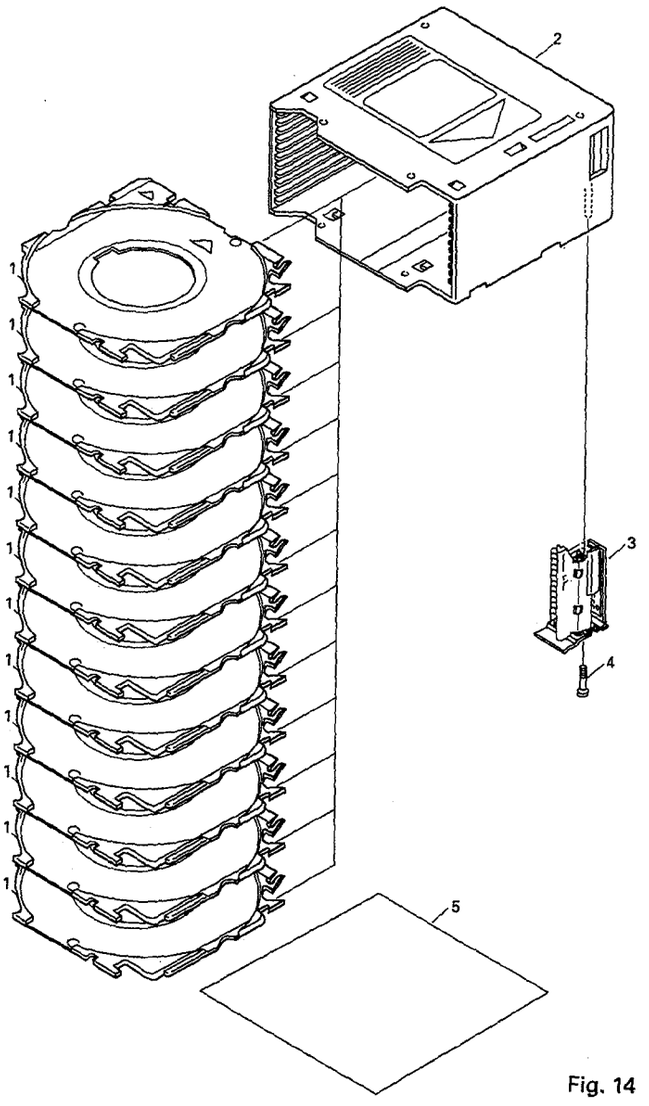


Fig. 14

● **Parts List**

Mark No.	Description	Part No.
1	Tray Unit	CXA5484
2	Case Unit	CXA6160
3	Bracket Assy	CXA5475
4	Screw Assy(M2X13)	CBA1272
5	Label	CRW1269

13. PACKING METHOD

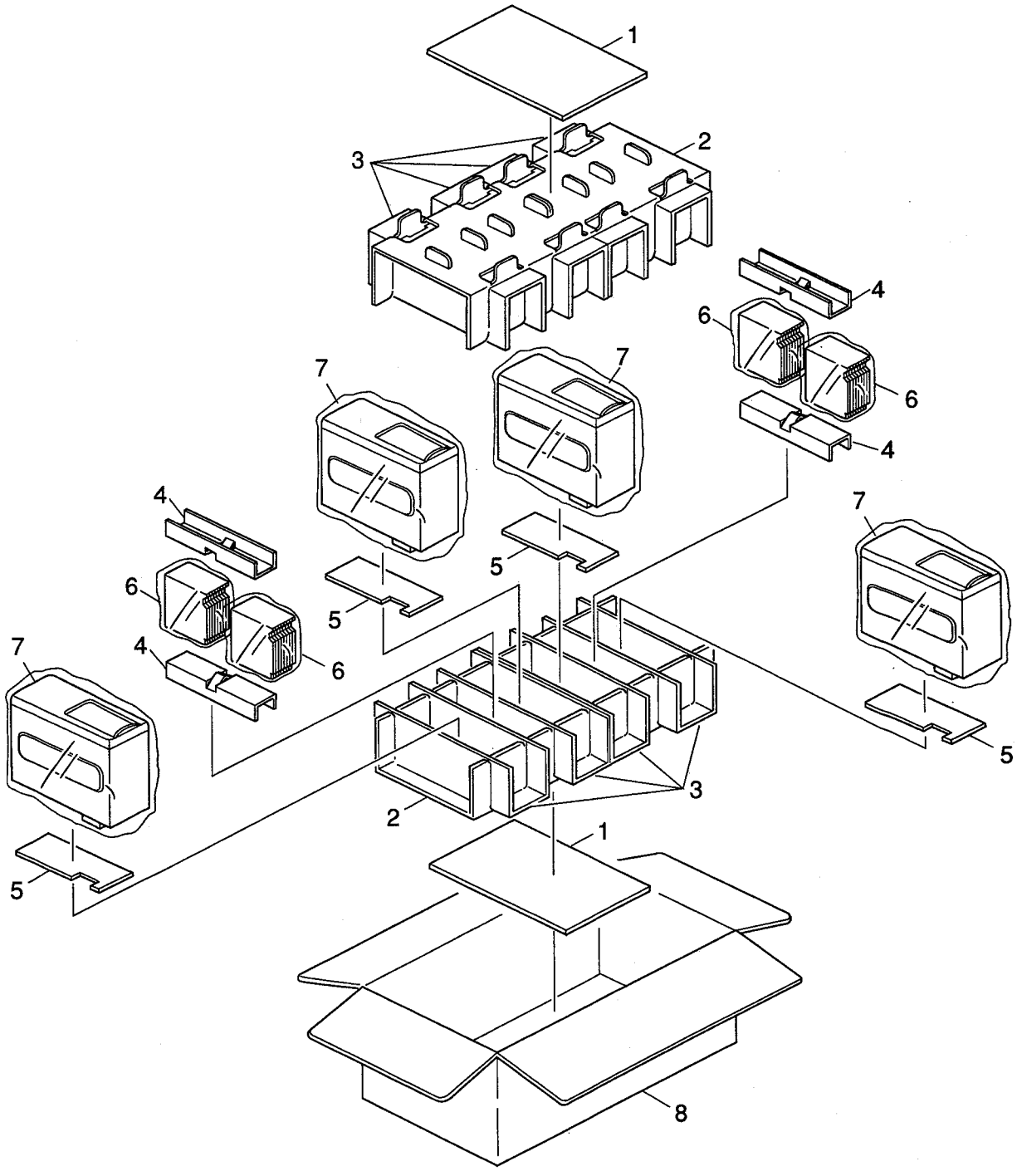


Fig. 14

● **Parts List**

Mark No.	Description	Part No.
1	Board	CHW1327
2	Protector	CHP1848
3	Protector	CHP1849
4	Protector	CHP1850
5	Protector	CHP1851
6	Magazine Assy	CXA7122
7	Polyethylene Bag	CEG1149
8	Contain Box	CHL3076

14. USING THE CEN-822 CD CONTROLLER TOOL

14.1 OUTLINE (FRONT PANEL)

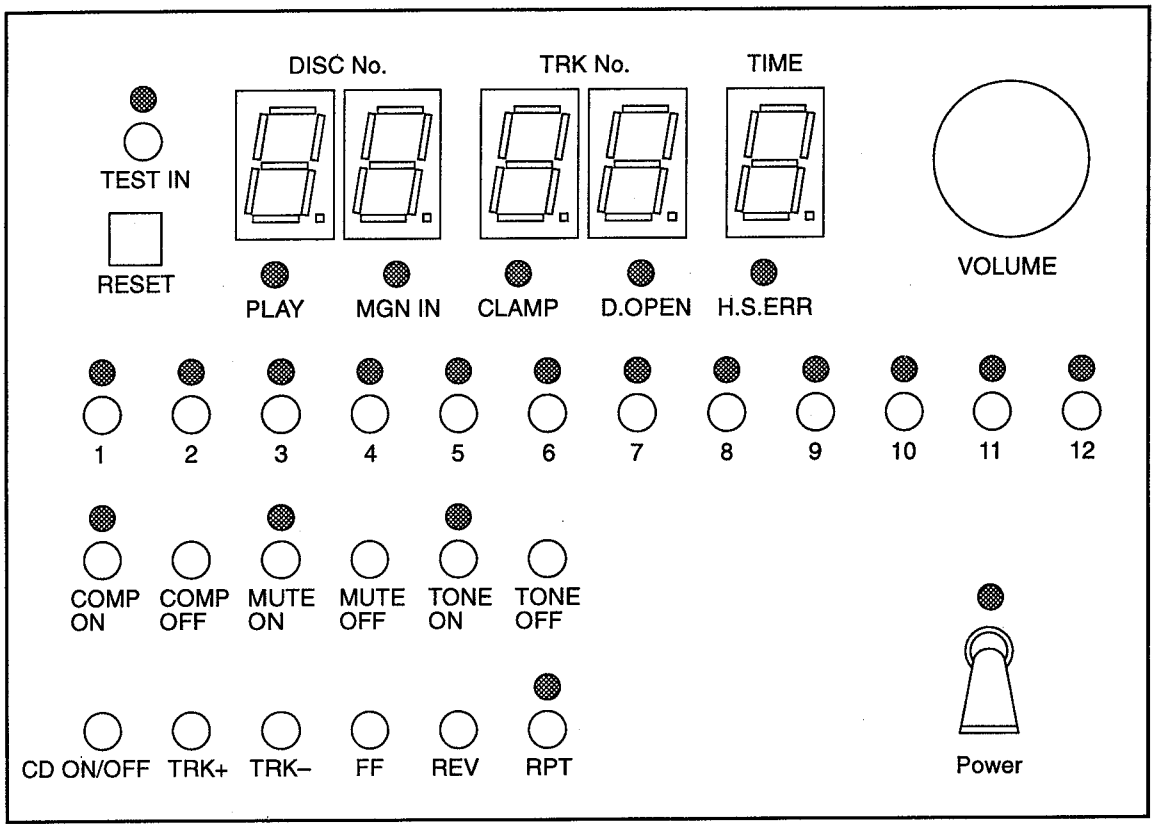


Fig. 15

Display

TEST IN: Lit during Test mode.
PLAY: Lit during play in Normal mode.
MGN IN: Lit when the magazine is inserted.
CLAMP: Lit when the machine is clamped.
D. OPEN: Lit when the door is open.
H.S. ERR: Lights up when an data communication error occurs between the controller and M-CD.
1-12: The LEDs for the trays with a disc inserted light up after Disc Sense in Normal mode.
COMP ON: Lit when Compression is ON.
MUTE ON: Lit when Mute is ON.
TONE ON: Lit when Test Tone is ON (for factory use).
RPT: Lit during Repeat Playback in Normal mode.
TIME: Only the seconds are displayed on the TIME display.

14.2 OUTLINE (REAR PANEL)

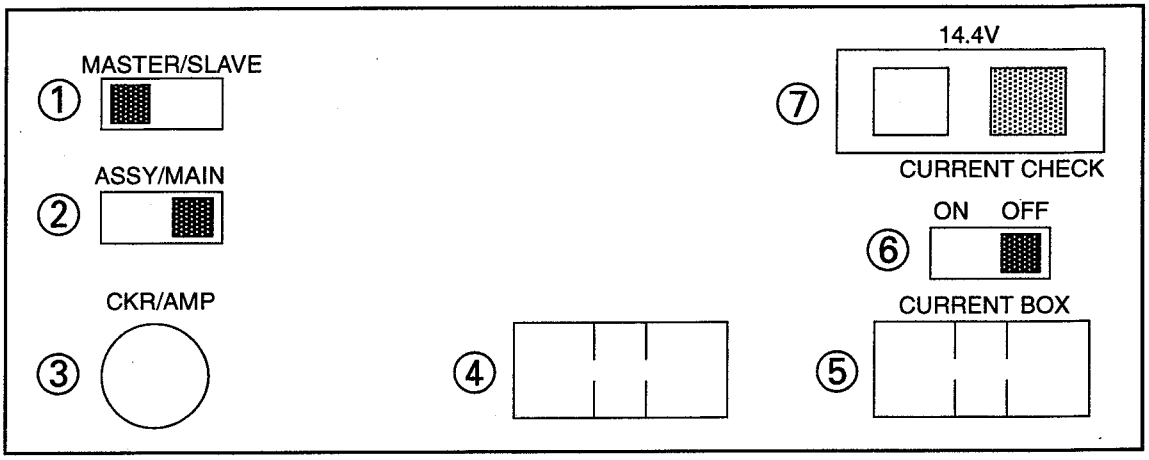


Fig. 16

① Set to the MASTER side. (The SLAVE side is not used.)
② Set to the MAIN side. (The Assy side is not used.)
③ Connect a power amplifier with 8pin DIN input.
④ Connect the changer using the CDN-960.
⑤ Not used
⑥ Set to the OFF side.
⑦ Connect to the power supply.

14.3 CONNECTION DIAGRAM

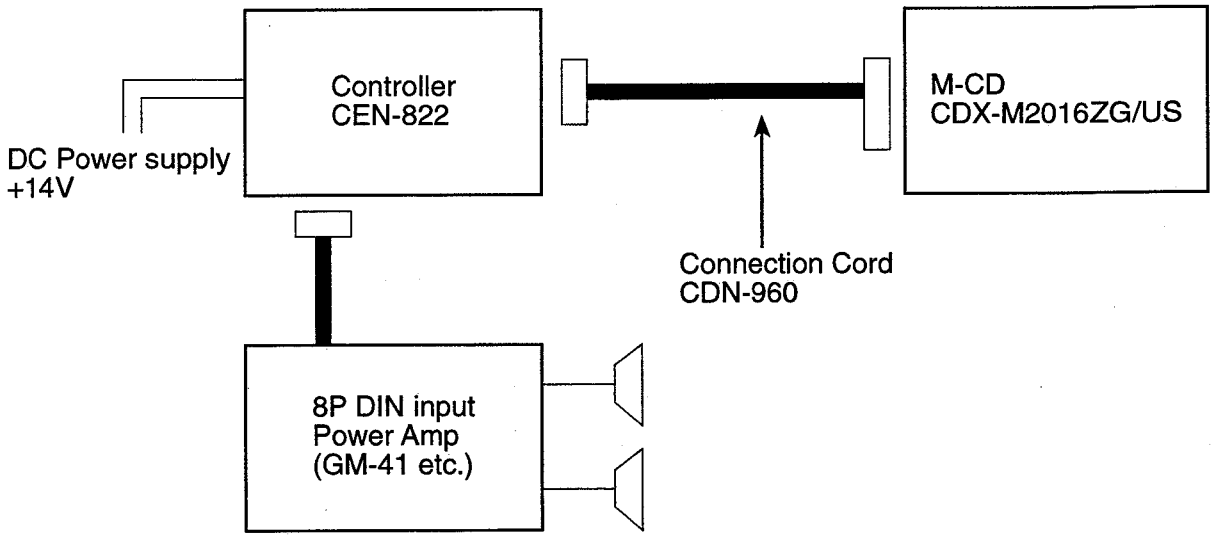


Fig. 17

Note: To operate the system, a power amplifier must be connected.

14.4 HOW TO USE

a) Normal mode

1. Connect the M-CD (CDX-M2016ZG/US) to the Controller Tool. (See the connection diagram.)
2. Switch the power of the Controller Tool ON (see Figure *1).
3. Insert the magazine. (The system performs Disc Sense. The LEDs (1 to 12) for the trays with a disc inserted light up. Other operations cannot be performed during Disc Sense.)
4. Press the [CD ON/OFF] button to play the current disc (see Figure *2).
5. See Table 1 for other operations. (To change discs, use the 1 to 12 buttons during playback to select a disc.)

b) Test mode

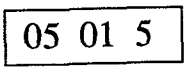
1. While holding down the [TEST IN] button, press the [RESET] button.
   Release the (RESET) button and then the (TEST IN) button (see Figure *3).
2. Press the [CD ON/OFF] button to set the regulator to ON (see Figure *4).
3. Press the [RPT] button to close the FOCS servo.
4. Press the [TRK+] button to close the TRKG servo (see Figure *5).
   Pressing the [TRK+] button twice displays the focus gain on the TRK NO display. Pressing the [TRK+] button three times displays the tracking gain on the TRK NO display. (Default for gain in AGC is 20.)
5. See Table 1 for other operations.

Note: If the system is affected by memory or a malfunction (for example, cannot activate or cancel Test mode), switch the power of the system OFF then ON again, then reset the M-CD.

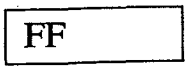
LCD Display

*1

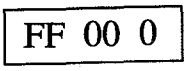
*2



*3



*4



*5

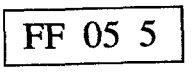


Table 1

Perform adjustment according to the adjustment items.

Buttons	Movement	
	Nomal Mode	Test Mode
TEST IN	–	Enter into the test mode
RESET	Reset	Reset
1–12	Disc select	Disc select
COMP ON	Digital compression ON	–
COMP OFF	Digital compression OFF	–
MUTE ON	Mute ON	–
MUTE OFF	Mute OFF	–
TONE ON	Test tone ON (for factory use)	–
TONE OFF	Test toneOFF (for factory use)	–
CD ON/OFF	Play/Stop	Regulator ON/OFF
TRK +	Forward TRK search	TRK close/ACC display change
TRK –	Reverse TRK search	TRK open
FF	Forward scan	Forward PU transfer
REV	Reverse scan	Reverse PU transfer
RPT	Repeat	Focus close

PIONEER®
The Art of Entertainment

PION-04367

Service Manual

ORDER NO.
CRT1658

CD MECHANISM UNIT

CX-633

COMPACT disc DIGITAL AUDIO

- **This service manual describes operation of the CD mechanism incroporated in models listed in the table below.**
- **When performing repairs use this manual together with the specific manual for model under repair.**

Model	Service Manual	CD Mechanism Unit
CDX-P1210/UC,EW,ES	CRT1659	CXK4100

CONTENTS

1. DISASSEMBLY 2
2. MECHANISM DESCRIPTION 5

PIONEER ELECTRONIC CORPORATION 4-1, Meguro 1-Chome, Meguro-ku, Tokyo 153, Japan
PIONEER ELECTRONICS SERVICE INC. P.O.Box 1760, Long Beach, California 90801 U.S.A.
PIONEER ELECTRONICS OF CANADA, INC. 300 Allstate Parkway Markham, Ontario L3R OP2 Canada
PIONEER ELECTRONIC [EUROPE] N.V. Haven 1087 Keetberglaan 1, 9120 Melsele, Belgium
PIONEER ELECTRONICS AUSTRALIA PTY.LTD. 178-184 Boundary Road, Braeside, Victoria 3195, Australia TEL:[03]580-9911

© PIONEER ELECTRONIC CORPORATION 1995

K-FFS.JAN. 1995 Printed in Japan

4367

1. DISASSEMBLY

● PU Unit Removal

When removing the connector to the PU unit, attach a short pin from the PU unit to the flexible circuit board.

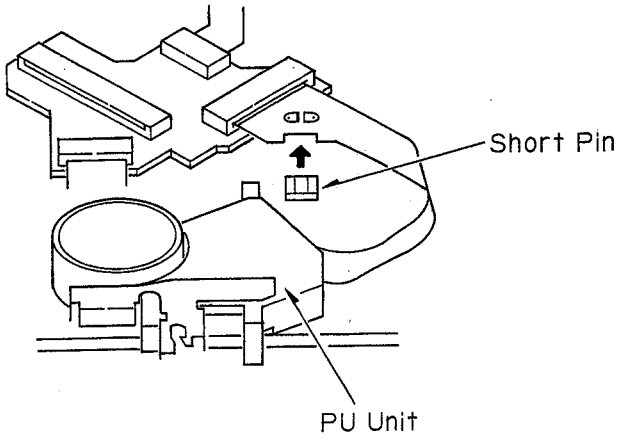


Fig.1

1. Remove the flexible circuit board from the connector.
2. Stretch the spring and hook it on the protrusion.
3. Undo the screw and remove the spring A.

NOTE: When assembling the PU unit, assemble so that section A clamps the shaft.

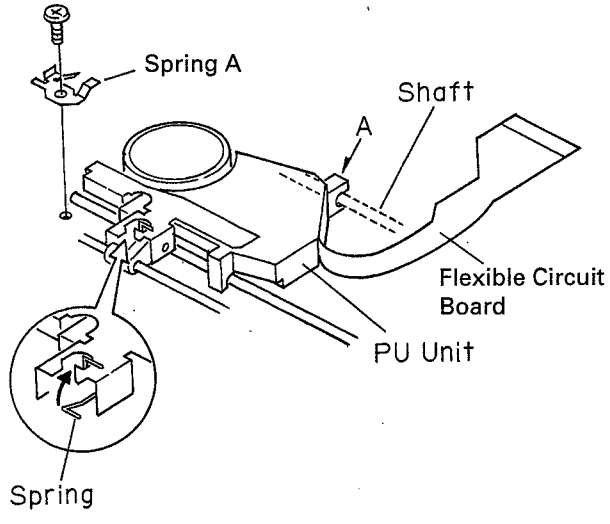


Fig.2

● Carriage Motor Assy Removal

1. Remove the screw, spring, belt, screw unit, and then remove the carriage motor assy.

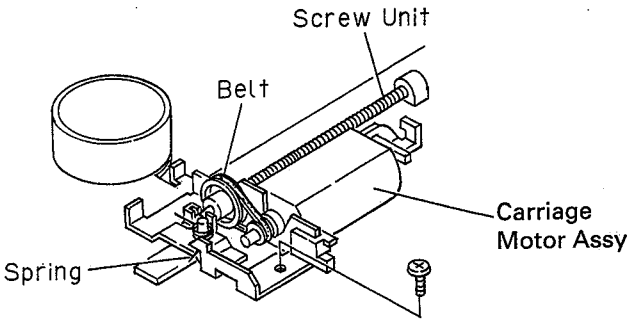


Fig.3

● Spindle Motor Removal

1. Undo the seven screws A, and then remove the frame and arm.
2. Undo the six screws B, and then remove the side frame.
3. Run the tray motor to and set the carriage mechanism to play (carriage mechanism lock is released).

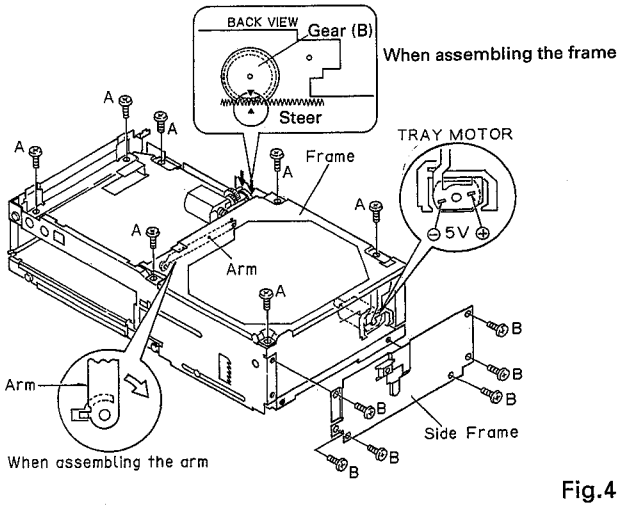


Fig.4

NOTE:

When assembling the frame, place the gear shaft with the arrow mark in the chassis, and align the ▲ mark of the steering to the ▲ of the gear B.

To assemble the arm, stand it upright and place it in the installation hole of the stage. Push it down towards the right and place the other end in the hole of the frame.

4. Turn the mechanism to its rear.
5. Remove the two springs; remove the clamper arm and spacer.

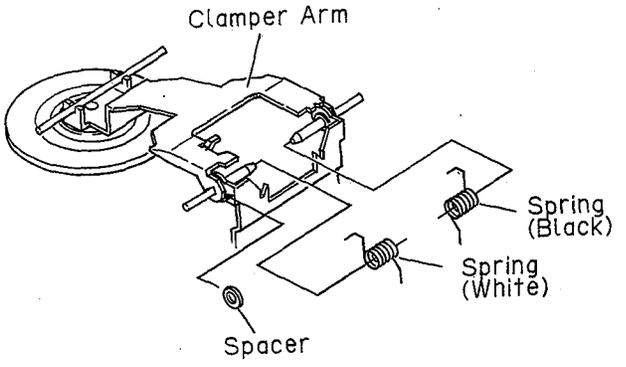


Fig.5

6. Face the mechanism forward.
7. Undo the six screws and remove the carriage mechanism assy.

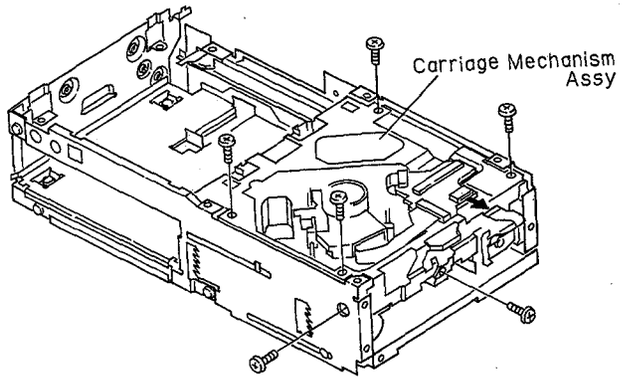


Fig.6

8. Remove the spring and side pressure arm.
   If the side pressure arm is difficult to remove, turn the cam in the direction of the arrow, flip the disc clamper up, and then remove the side pressure arm.
9. Undo the two screws and remove the spindle motor.

NOTE: When assembling the motor, tighten the screws at the position (angle) where the motor's lead wires reach the circuit board.

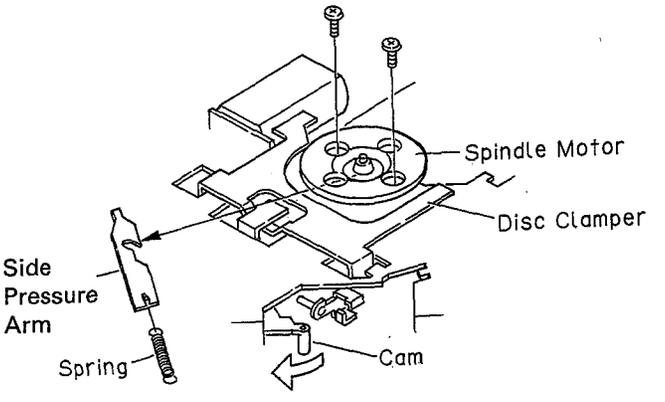


Fig.7

● Tray Motor Removal

1. Turn the mechanism to its rear.
2. Undo the one screw and remove the tray motor unit.

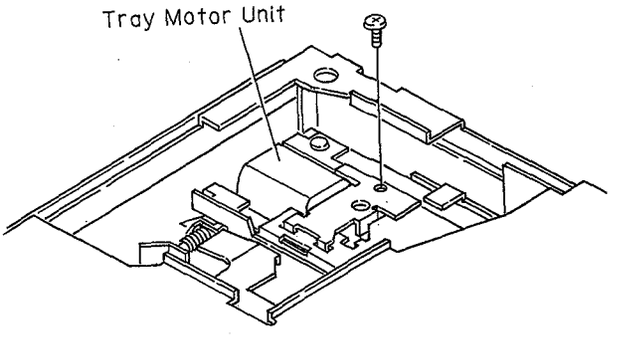


Fig.8

● Magazine Holder Removal

1. Turn the tray motor to set the mechanism at the area halfway between play and stop.
2. Undo the four screws and remove the magazine holder.

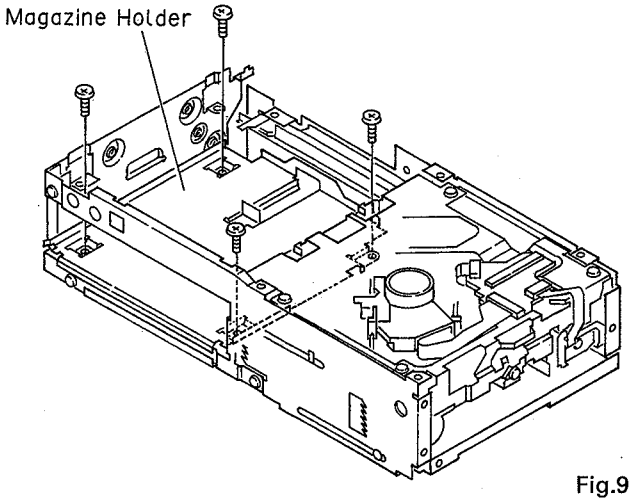


Fig.9

● Meshing of Gears When Assembling (fig. shows top view of mechanism)

Cam ring is turned all the way in the counter-clockwise direction.

1. Tray extraction gear section

A) Intermittent gear

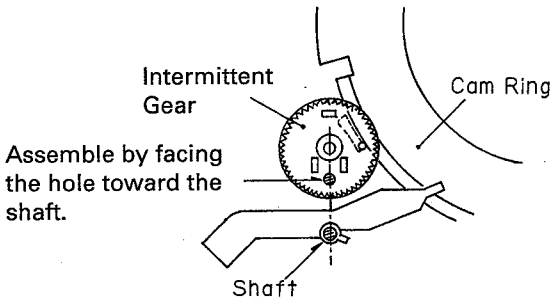


Fig.10

B) Acceleration gear

Assemble by overlapping the holes of the intermittent gear and acceleration gear.

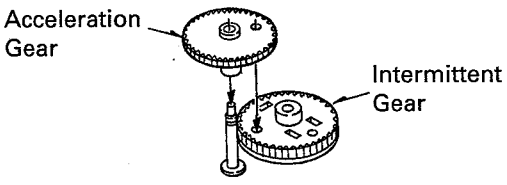


Fig.11

C) Idler gear

Assemble so that the tooth of the acceleration gear with the △ mark meshes with the valley of the idler gear with the △ mark.

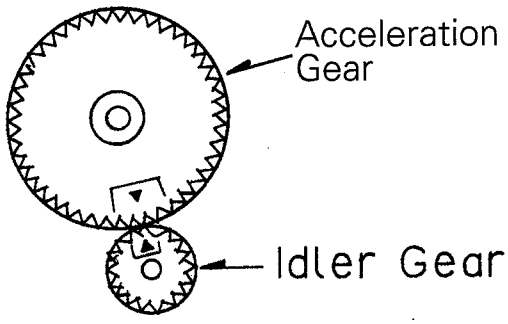


Fig.12

D) Tray gear

Assemble so that the tooth of the idler gear with the ○ mark meshes with the valley of the tray gear with the ○ mark. Also, assemble so that the valley of the tray gear with the △ mark meshes with the last tooth at the end of the tray extraction lever's rack.

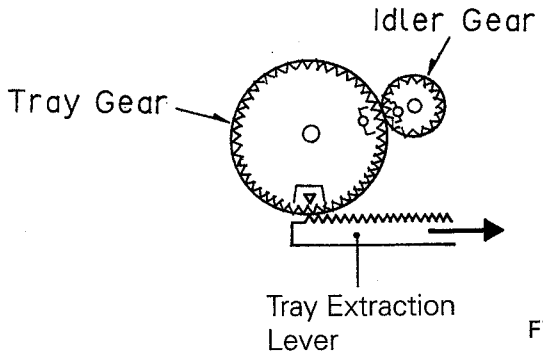


Fig.13

2. MECHANISM DESCRIPTION

● Magazine Insertion

1. When the magazine is inserted against the force of the eject lever's spring, the eject lever pushes the tip of the magazine SW arm directly before the magazine lock position, causing the arm to swing. This in turn causes the part where the magazine lock arm and magazine SW arm overlap to separate, with the magazine lock arm swinging upward.

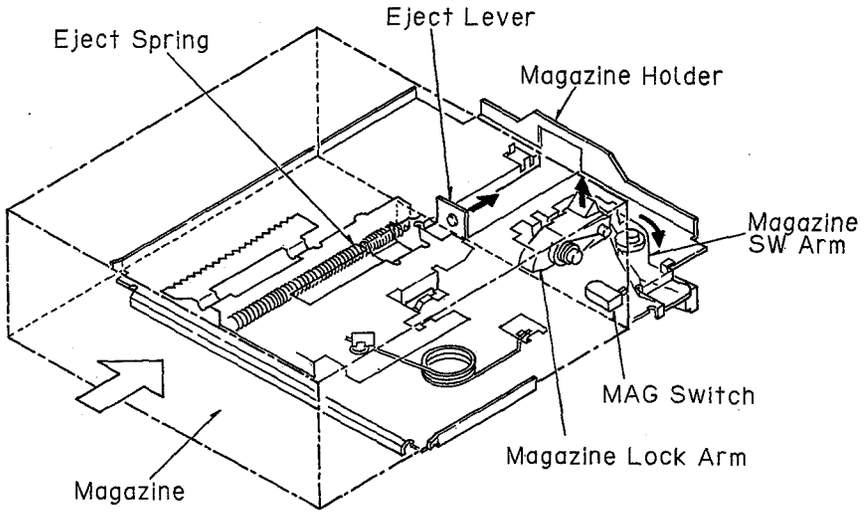


Fig.14

2. If the magazine is inserted up to the lock position, the catch of the lock arm enters the magazine's lock slot, thus locking the magazine. The tapered part of the tip of the magazine lock arm pushes the magazine SW arm, thus tripping the MAG switch.

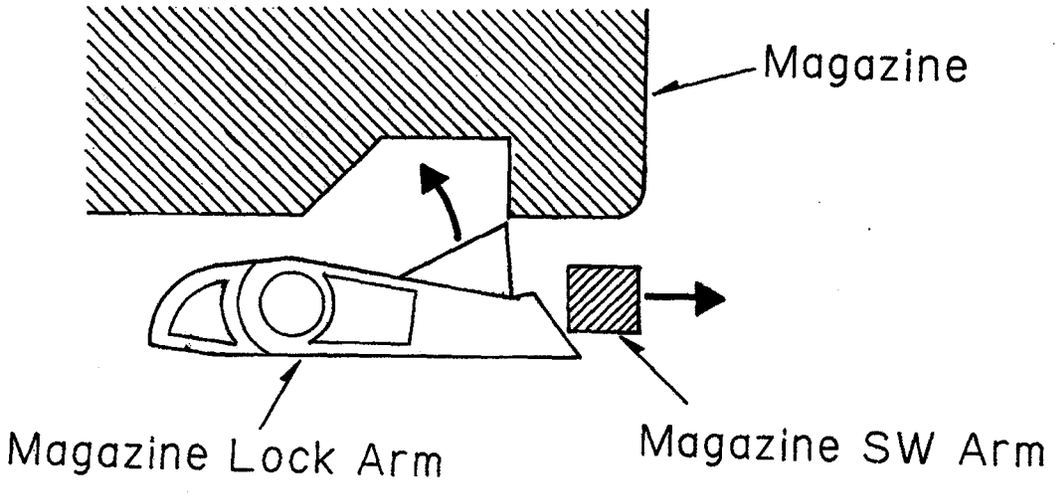


Fig.15

● Disc Clamp Operation

1. When the MAG switch is tripped, the tray motor turns and rotates the cam ring. When the cam ring rotates, the tray extraction intermittent gear and tray gear are rotated via the cam ring, causing the tray extraction lever to slide. The tray is then drawn out by the tray extraction lever.

View from below with the stage lower cover removed

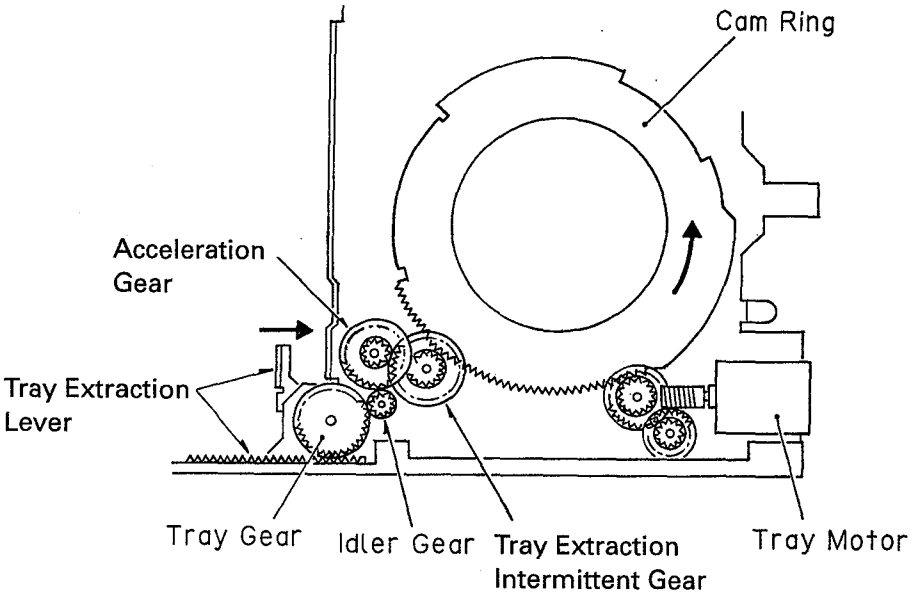


Fig.16

2. After the tray is drawn out, if using an 8 cm disc, the fingers of the disc clamper are released.

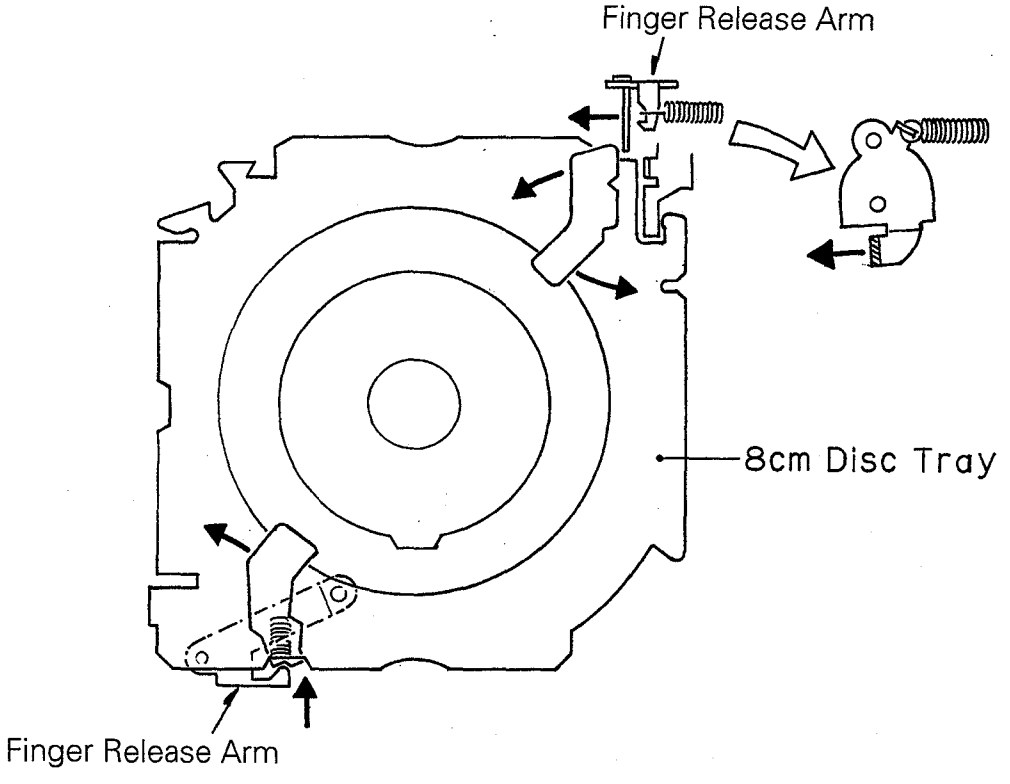


Fig.17

3. When the disc holder fingers have been released, the clamper arm rises and clamps the disc.

3-1. As the lever retaining the shaft at the tip of the clamper arm slides and escapes, the curved part of the cam ring simultaneously retains the shaft, and the spring-activated clamper arm rises.

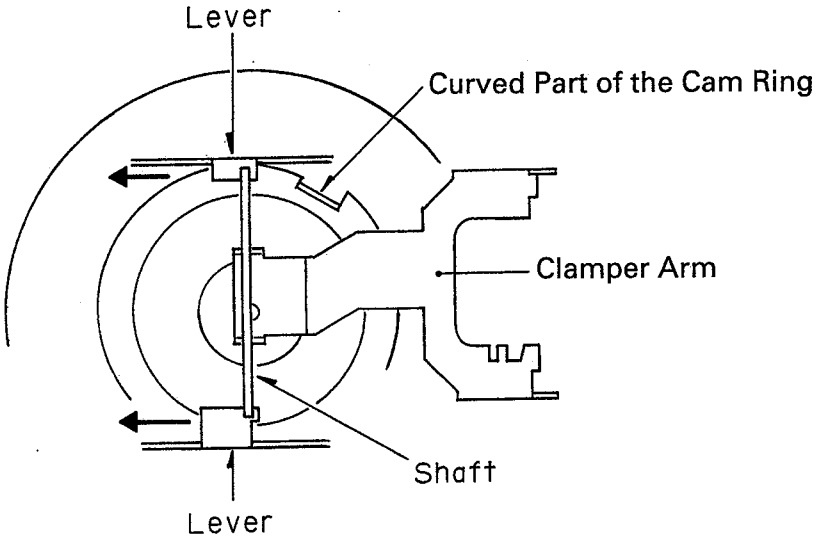


Fig.18

3-2. At the same time the disc clamp performs this action, the clamp and the large and small disc holder arms clamp the disc.

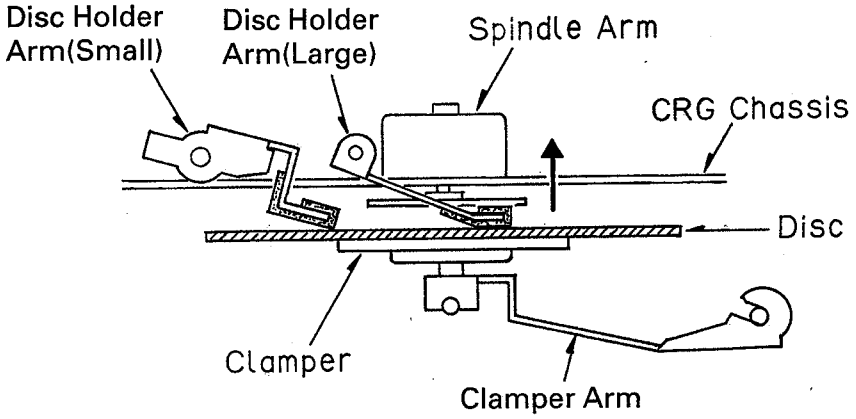


Fig.19

3-3. The large and small disc holder arms are moved up and down by the turning of the disc holder cam. The cam turns while being clamped by the curved part of the CRG lock lever.

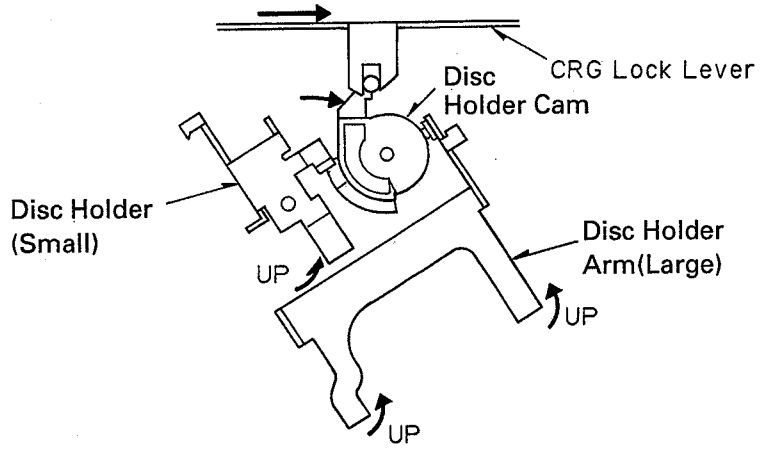


Fig.20

● CRG Chassis Lock Release

1. After clamping is complete, the tray motor continues to turn, and begins the procedure to release the CRG chassis locks. The locations of the locks are indicated by ① ② ③ in fig. 21. Locks ① ② ③ are released almost simultaneously.

① The cam ring turns causing the arm to rotate. The contraction of the arm tip and the CRG lock lever's slot are interlinked. When the arm turns, the CRG lock lever slides, thus releasing the CRG chassis's lock (up/down direction).(Fig. 22)

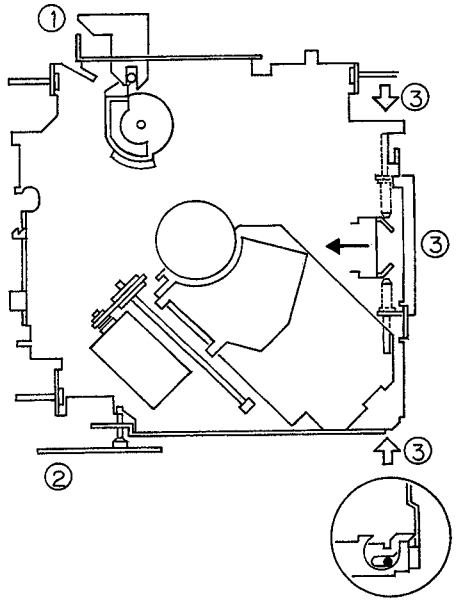


Fig.21

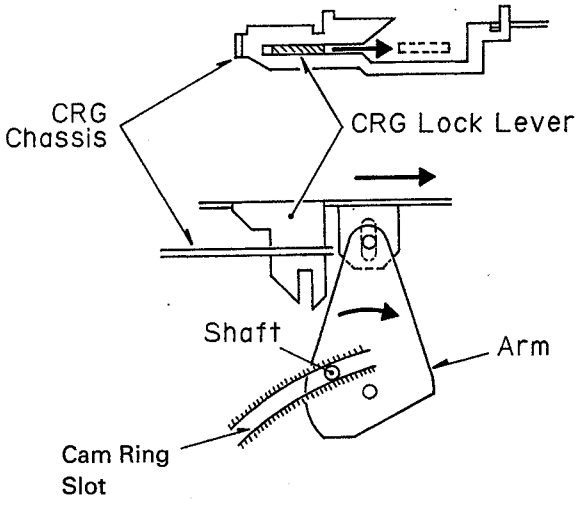


Fig.22

② The cam ring turns causing the link to be pushed, sliding the CRG lock lever, thus releasing the CRG chassis's lock (up/down direction).(Fig. 23)

③ The cam ring turns and the CRG lock lever slides. The tip of the lever inserted between the CRG chassis's shafts such that it is clamped by the shafts separates, thus releasing the CRG chassis's lock (front/rear direction).(Fig. 24)

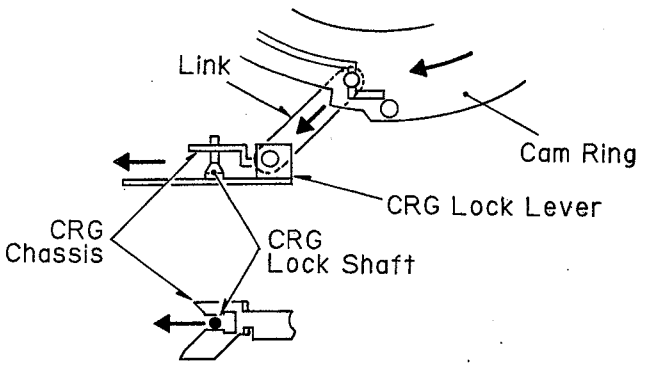


Fig.23

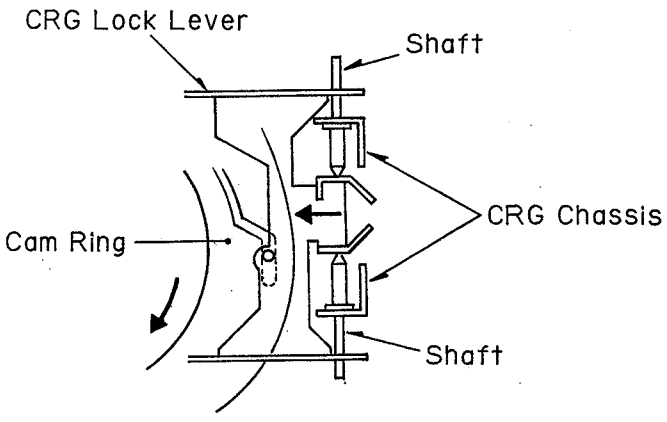


Fig.24

2. Simultaneously with the operation described above, the CRG lock lever slides, the CRG lock arm swings, freeing the clamped shaft and releasing the CRG chassis's up/down and right/left locks.
   The operations described above release the locks of the CRG mechanism leaving it "floating."

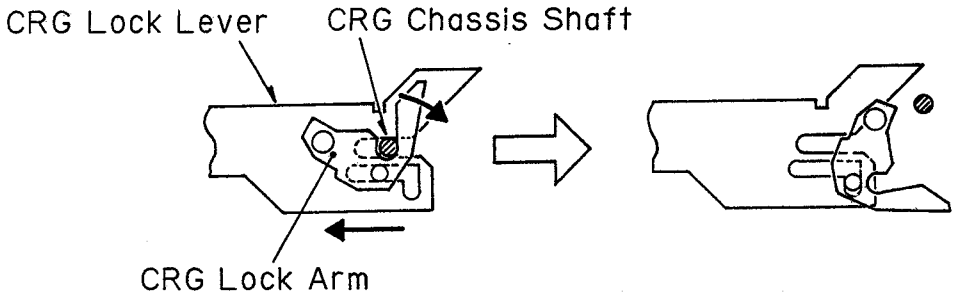


Fig.25

● Stage Lock

Looseness in the elevator mechanism is eliminated and vibration resistance is enhanced by locking the three (① ② ③) locations shown in fig. 26.

1. The CRG lock lever slides and pushes the stage lock lever. (Fig. 27)
2. The wedge shape of the lever tip is held in place by the square hole of the frame, and the stage mechanism is actuated in the left/right and up/down directions.(Fig. 27)

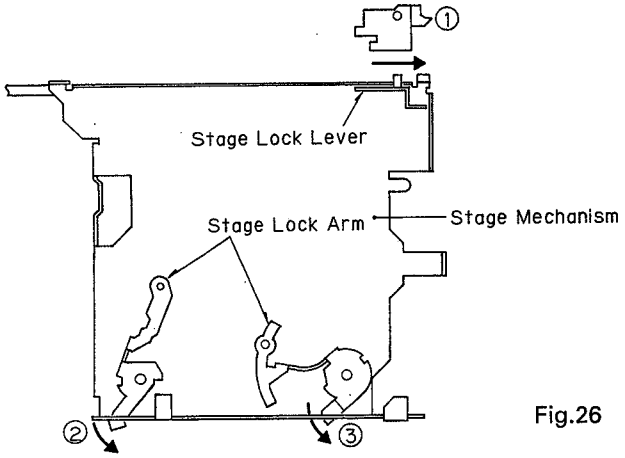


Fig.26

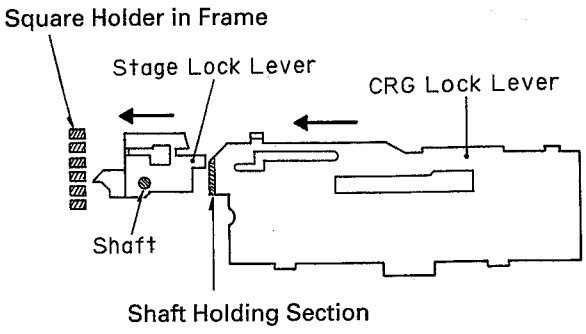


Fig.27

3. The rotation of the cam ring causes the stage lock arm to swing. The tip of the arm is held in place by the tapered part of the frame, and the stage mechanism is actuated in the left/right, up/down and front/rear directions.(Fig. 28,29)

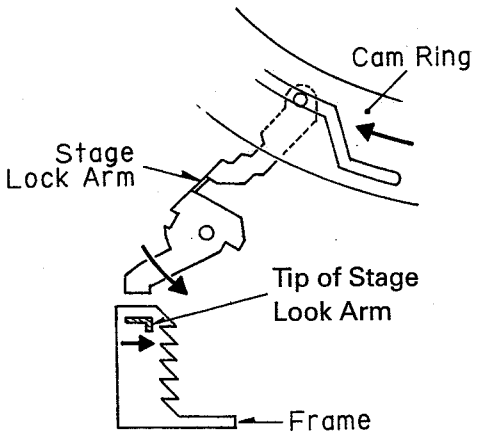


Fig.28

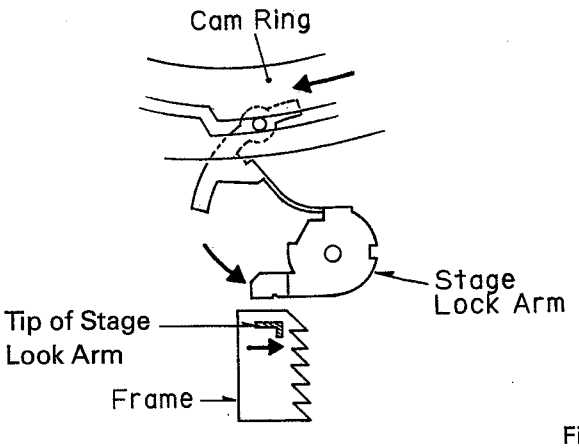


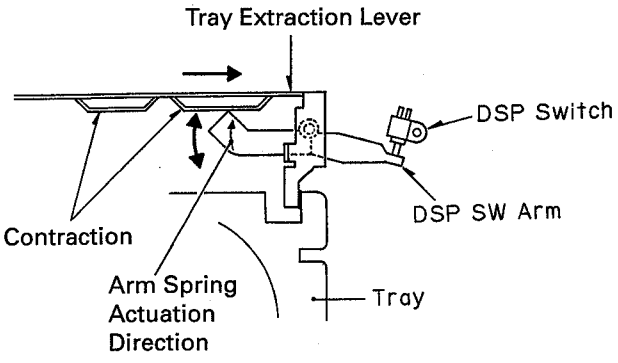
Fig.29

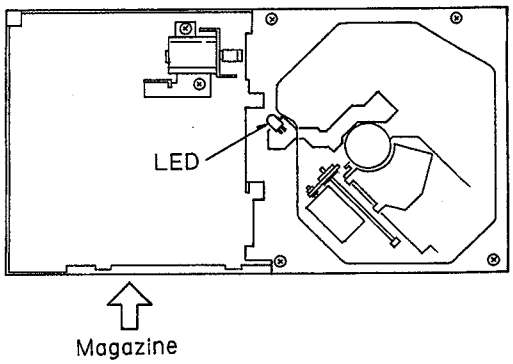
● **From Play to Tray Storage**

This operation is basically carried out in reverse of the operation from disc clamp to stage lock.

● **Disc Detection, Tray extraction/insertion Completion Detection**

The DSP switch is turned on and off by the contracting part of the tray extraction lever for extracting and inserting the tray, and the photosensor detects whether the tray contains a disc or not, and whether the disc is 8 or 12 cm, while being timed.





The photo-transistor is on the stage mechanism side and the LED is on the CRG mechanism side. The tray passes between the two.

Fig.30

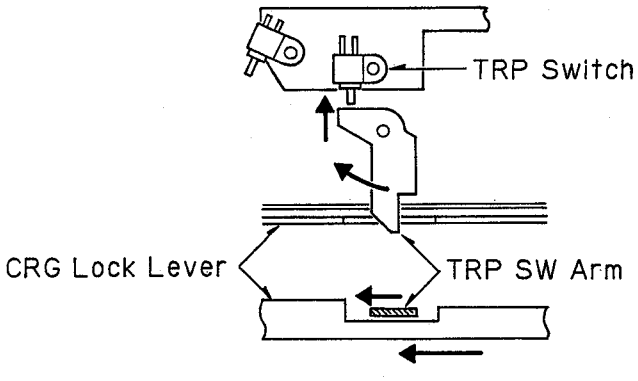
● **Tray extraction/insertion Completion Detection**

A) Play side(Fig. 31)

When play is complete, the CRG lock lever slides, pushing the tip of the TRP switch arm and turning the switch on.

B) Tray return side (eject side)(Fig. 32)

When tray return is complete, the tray extraction lever pushes the TRP SW lever, the TRP SW lever pushes the TRP SW arm, turning the TRP switch on.



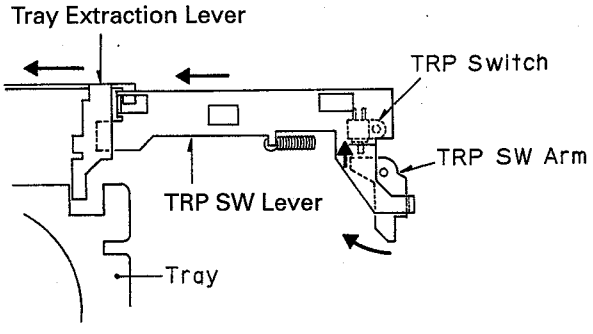


Fig.31

Fig.32

● Elevator Operation

1. The inside steer slides when the ELV motor is driven. The front steer interlinked with the inside steer also slides. The shaft protruding from the stage mechanism is interrelated with the three front/rear stage holes, and the stage moves up or down when the steer slides. A gravitational force counter spring and front steer spring is provided on the magazine side arm in order to relieve the difference in load caused by gravitational force for rising and lowering.

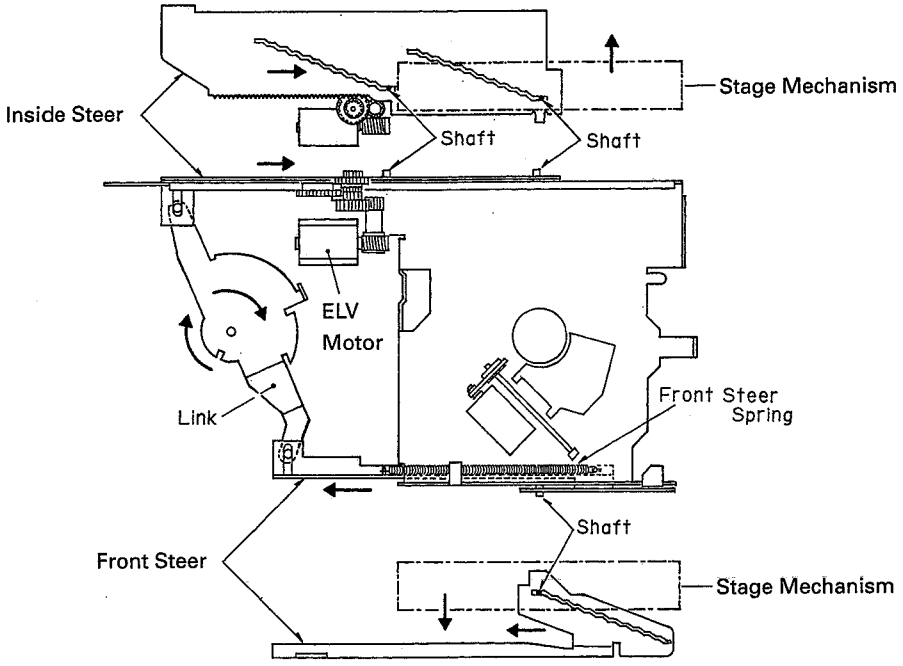


Fig.33

Gravitational force counter spring

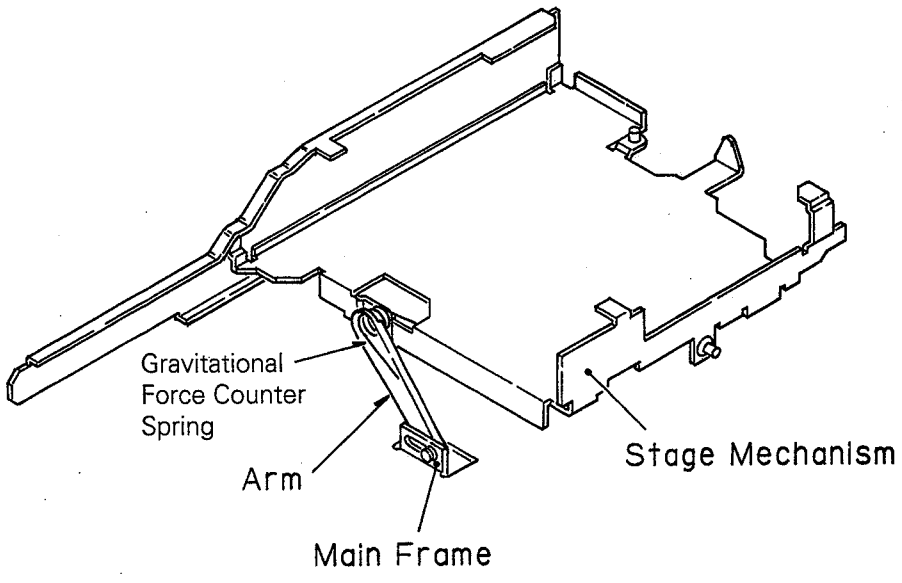


Fig.34

● Elevaton Detection

1. The gear B operates intermittently by moving a step when the gear A turns half circle, then stopping at the straight part of the step hole of the steering. The gear A has holes (two places) at this stepping position and the phototransistor detects these holes (Fig. 35).
2. The phototransistor detects the top step immediately after the RSTP switch is turned to ON. When the steering moves further, the gear A turns half circle and the phototransistor detects the next position of the hole. Thus, the system detects the position of magazine ejection (Fig. 36).
   Mechanical reset is detected at the same position as with the position of the top step.

- After the RSTP switch is turned to ON, the system detects resetting when the steering moves upward again from the point when it moved downward and the RSTP switch was turned to OFF.
- Operation after magazine ejection is the same as with resetting after the RSTP switch is turned ON.

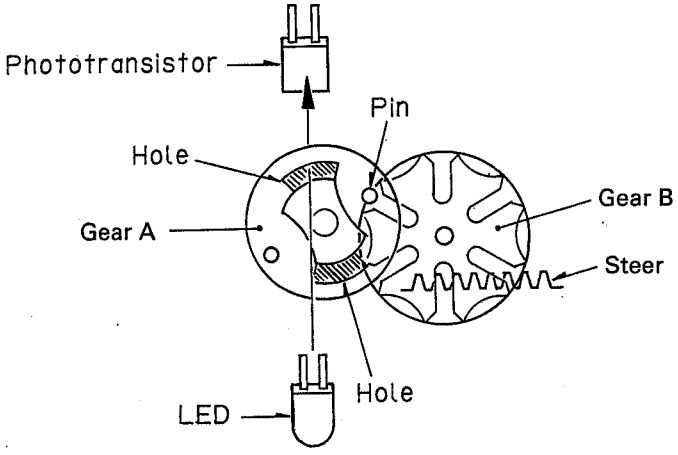


Fig.35

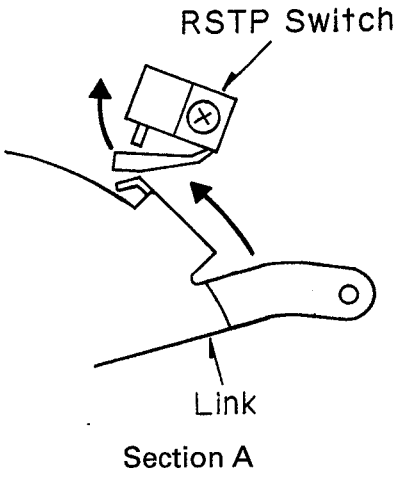


Fig.36

● Magazine Discharge

1. If the steer is further driven from the detection position of the elevator's highest stage, the contraction of the link pushes up the tip of the lock arm mentioned in "Magazine insertion." When it does, the lock part which is the tip of the other lock arm drops down below, releasing the magazine's lock. The magazine is discharged by the eject lever.

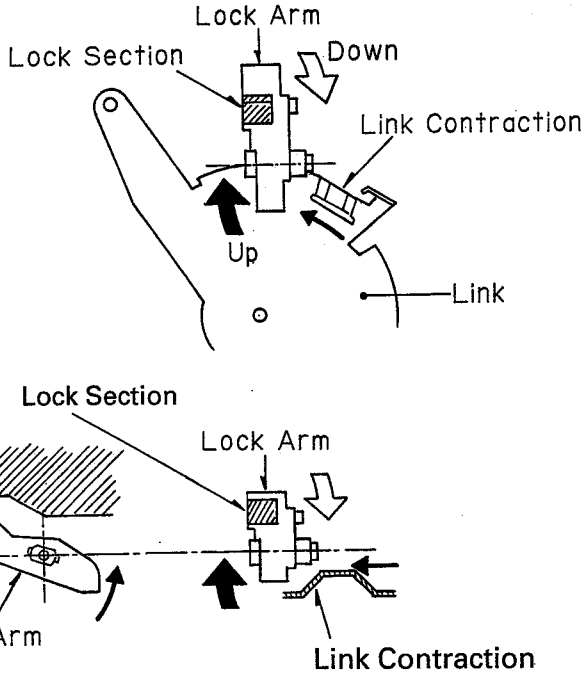


Fig.37